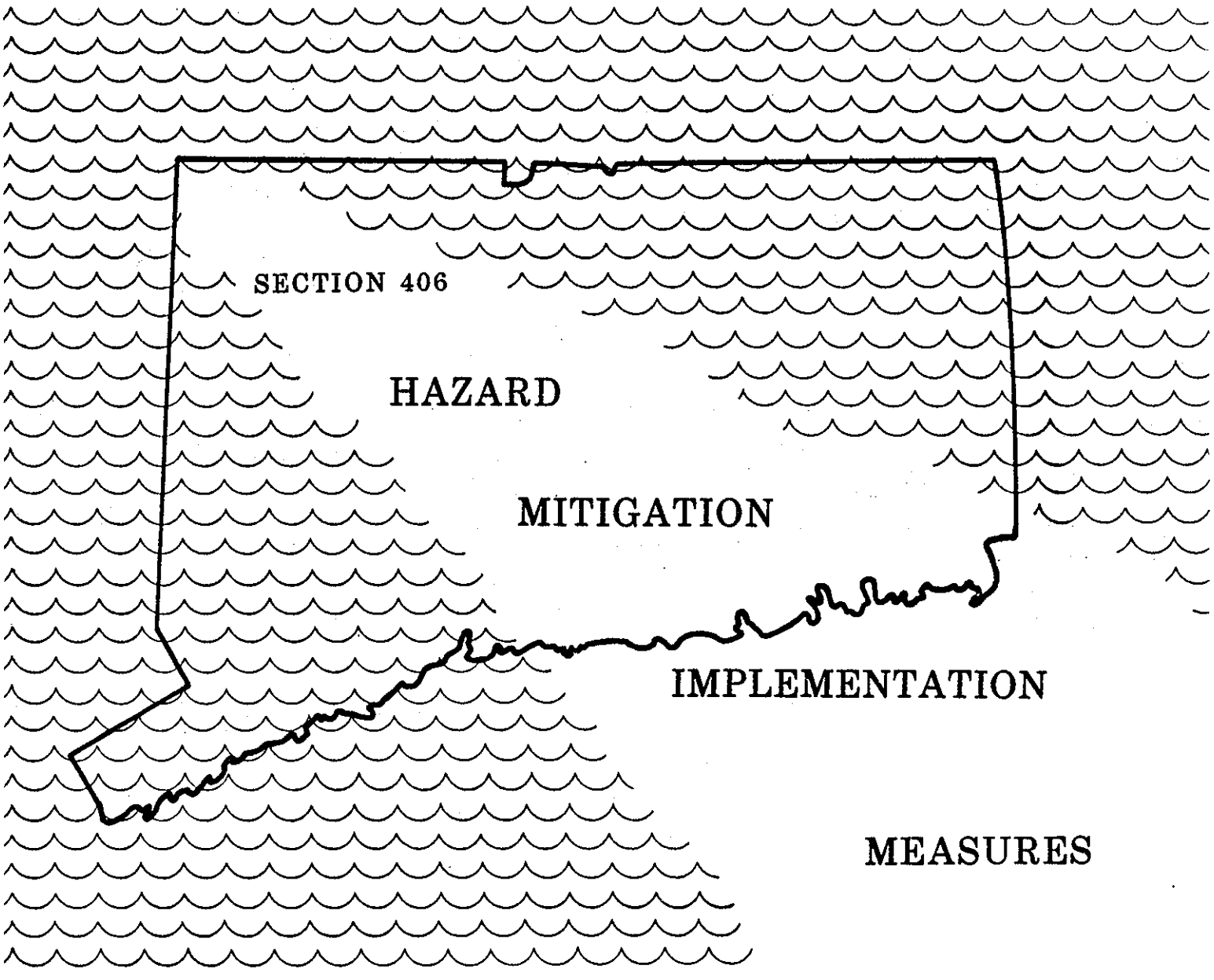
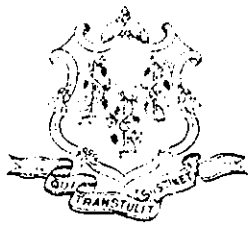
STATE OF CONNECTICUT



1983

WILLIAM A. O'NEILL
GOVERNOR



STATE OF CONNECTICUT
EXECUTIVE CHAMBERS
HARTFORD

August 17, 1983

Mr. David M. Sparks
Regional Director
FEMA Region I
J.W. McCormack Post Office and Courthouse
Boston, Massachusetts 02109

Dear Mr. Sparks:

Connecticut's flood hazard mitigation plan has been completed and is attached. The plan has been prepared pursuant to Major Disaster No. FEMA-661-DP, as required by Section 406 of Public Law 93-288, and in accordance with Federal Emergency Management Agency, (FEMA), revised reporting guidelines.

The current plan represents a coordinated effort and a commitment by all state agencies involved in pre-flood mitigation, flood emergency response, and flood recovery. The plan is a comprehensive document describing flood problems and existing mitigation measures in Connecticut.

As required by Section 406, the Connecticut plan also includes first and second priority action items which will either correct significant program deficiencies or prevent serious flood damage. The first priority items will be overseen by my office. I have delegated responsibility for second priority items to Commissioner Stanley J. Pac of the Department of Environment Protection.

In closing, I believe that the Connecticut flood hazard mitigation plan will compliment our state's existing mitigation programs, help to reduce Connecticut's future flood damage, and will satisfy FEMA and Section 406 requirements.

Sincerely,

WILLIAM A. O'NEILL
Governor

Enclosure

INDEX

SECTION 406

HAZARD MITIGATION IMPLEMENTATION MEASURES

STATE: Connecticut

DISASTER: FEMA-661-DR; Flooding of June 4-7, 1982

REPORT DATE: June, 1983

THIS DOCUMENT HAS BEEN COMPILED AND EDITED BY CHARLES BERGER, JR., CAROLYN HUGHES, AND ALLAN WILLIAMS OF THE CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION. COPIES OF THIS DOCUMENT ARE AVAILABLE FROM:

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HARTFORD, CT 06106

I. INTRODUCTION

A. Authorities: Public Law 93-288, as amended
President's Executive Order 11988
Federal-State Disaster Assistance
Agreement No. FEMA-661-DR
Titles 22a, 25, and 28 of the Connecticut General Statutes
Executive Order No. 18 of Ella Grasso

B. Purpose: To fulfill the requirements of the Federal-State Agreement for Federal Disaster Assistance FEMA-661-DR, to minimize long and short term flood hazards, and to reduce the need for future disaster assistance.

C. Scope: This report addresses hazard mitigation implementation for the entire state, with special attention to those areas which received the most severe losses in the June flood. This report is structured as per the outline of February 17, 1983, developed at the FEMA 406 Hazard Mitigation Planning Course.

II. BACKGROUND

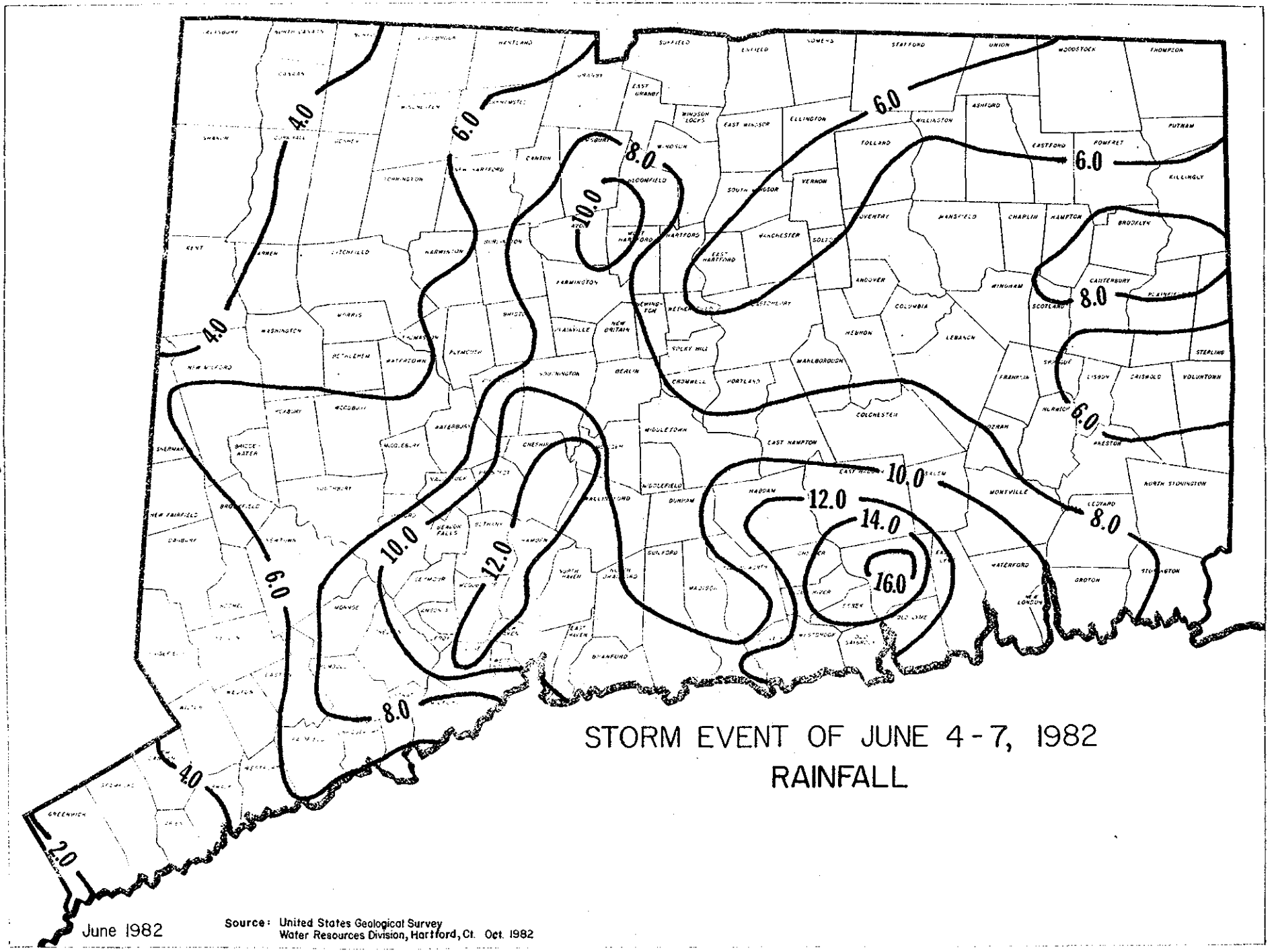
General Description of the State

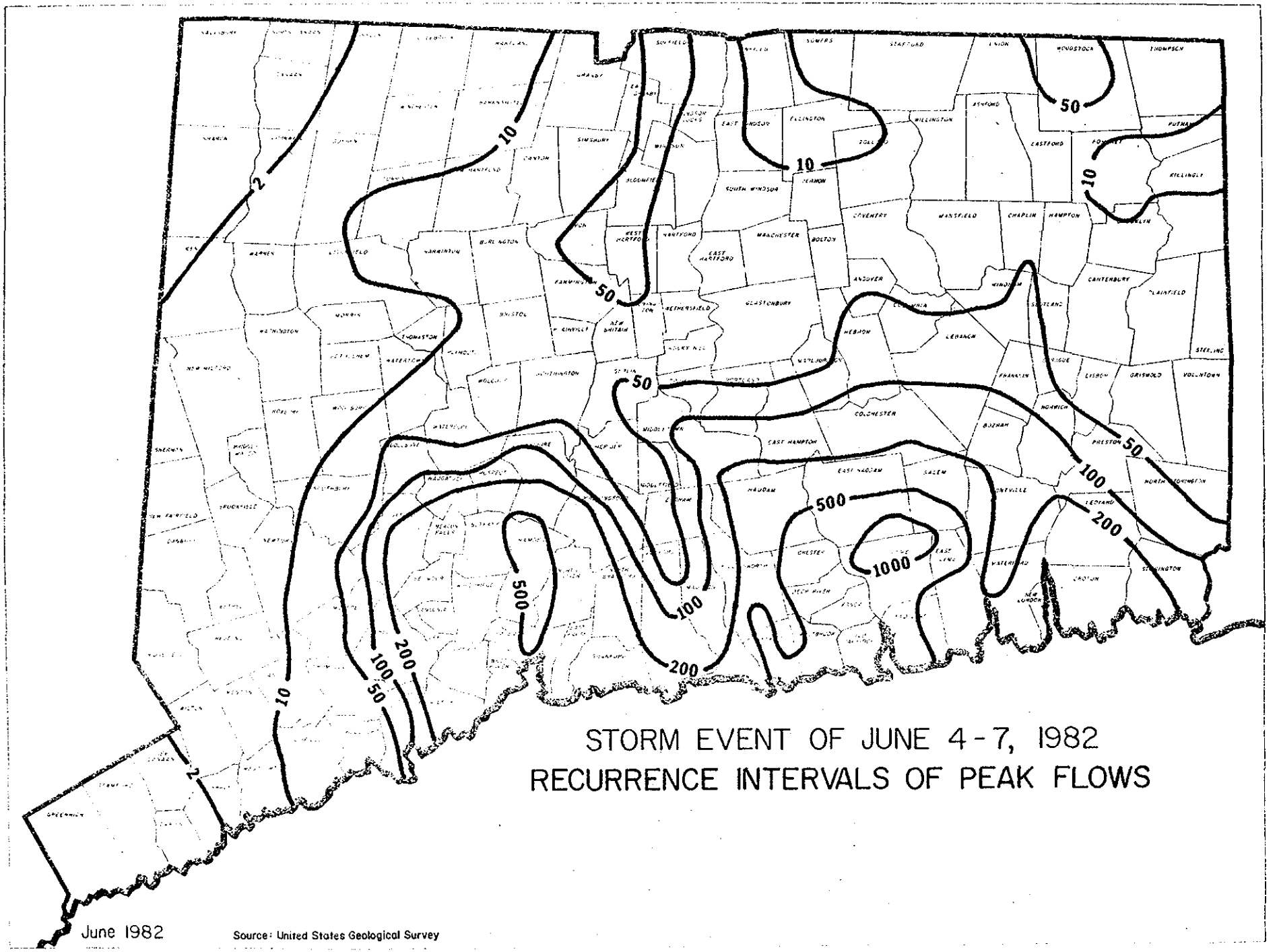
The State of Connecticut has a 1983 population of approximately 3,136,000 residing within 5,009 square miles of terrain varying from sea level to about 2,000 feet above sea level. There are approximately 8,400 miles of rivers and streams, 6,000 lakes and ponds, 3,200 dams, and 253 miles of shoreline. Because shoreline and riverine areas are relatively flat and easy to build upon, and because of historic uses of water for power or industrial processes, there has been considerable commercial, residential, and industrial development in the valley and shore areas.

A. Description of event

Rainfall of between 4 and 16 inches fell between June 4 and 7, 1982, resulting in recurrence intervals of peak flows that varied between the 50 percent (or two year) flow and the .01 percent (or 1,000 year) flow. This precipitation occurred after about a week of prolonged rainfall had saturated the ground. Dam failures, especially in the area of most intense rainfall, were responsible for the flows that caused the most severe damages. Thirty dams failed or were partially breached (about 3/4 of 1 percent of the total in the state). Figures 1 and 2 depict the rainfall and recurrence intervals of the storm.

Figure 1


4.0
6.0
8.0
10.0
12.0
14.0
16.0
2.0
STORM EVENT OF JUNE 4-7, 1982
RAINFALL
June 1982
Source: United States Geological Survey
Water Resources Division, Hartford, Ct. Oct. 1982


2
10
50
100
200
500
1000
STORM EVENT OF JUNE 4-7, 1982
RECURRENCE INTERVALS OF PEAK FLOWS
June 1982
Source: United States Geological Survey

B. Cost of disaster

Much of the information on losses is unconfirmed data. On or about October 1, 1983 the State of Connecticut expects to complete a report documenting the causes and results of the June flood. Preliminary information, as noted in the Interagency Flood Hazard Mitigation Report and other reports indicates that 37 homes were destroyed and 1,500 sustained significant damage. About 200 commercial and industrial establishments suffered damages from a few thousand to multi-millions of dollars with total commercial and industrial damages and lost business estimated at $92,000,000.

Severe damage was caused to 18 major state bridges and 25 municipal bridges. Four sewage treatment plants were severely damaged. Total damages were about $270,000,000. Twelve deaths were attributed to the storm. Figures 3-8 depict losses throughout the state.

C. Description of previous events for all natural hazards.

This section briefly identifies and describes the natural hazards of Connecticut.

1. Hurricanes
2. Floods
3. Tornadoes
4. Coastal Shore Erosion

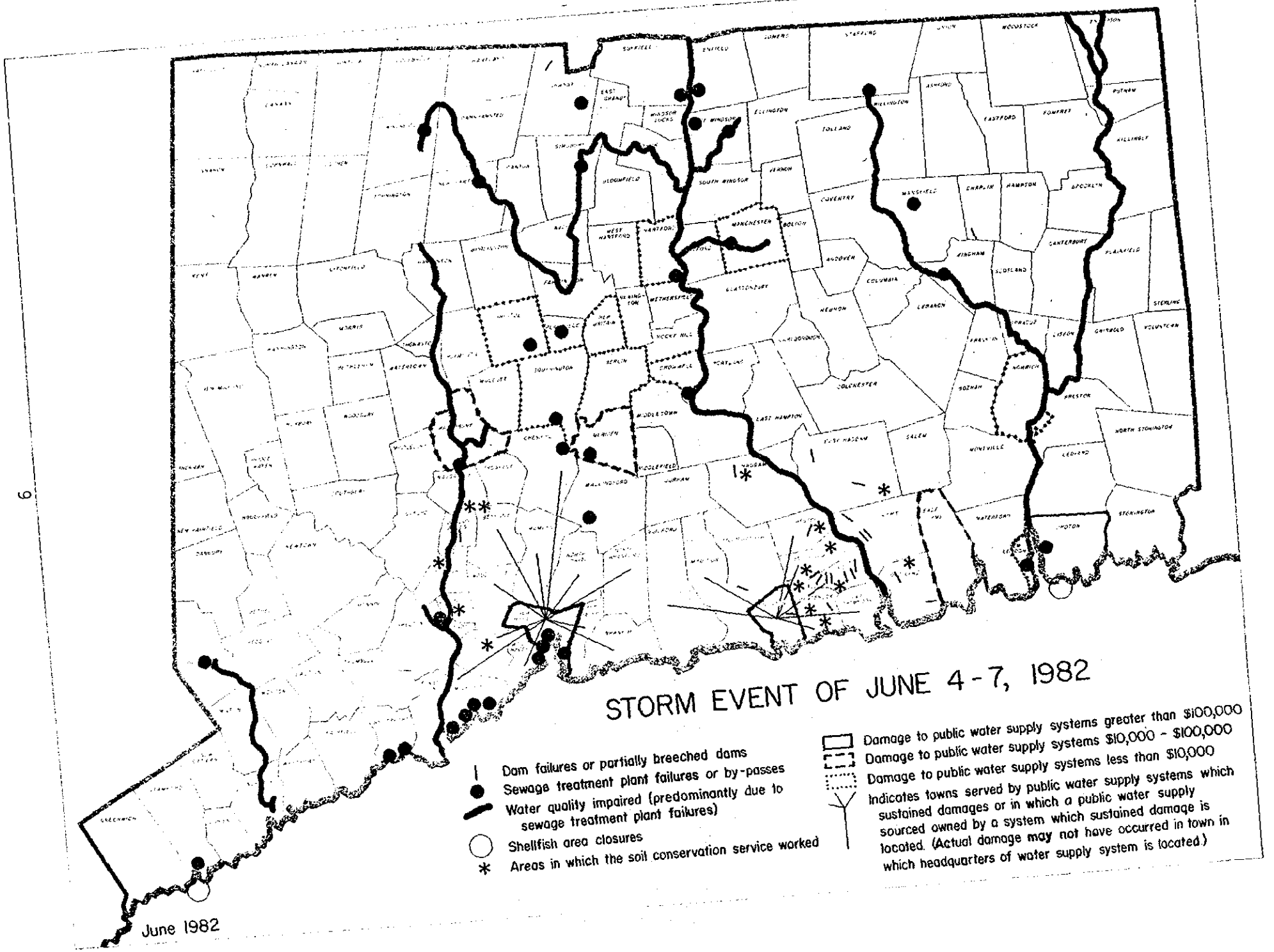
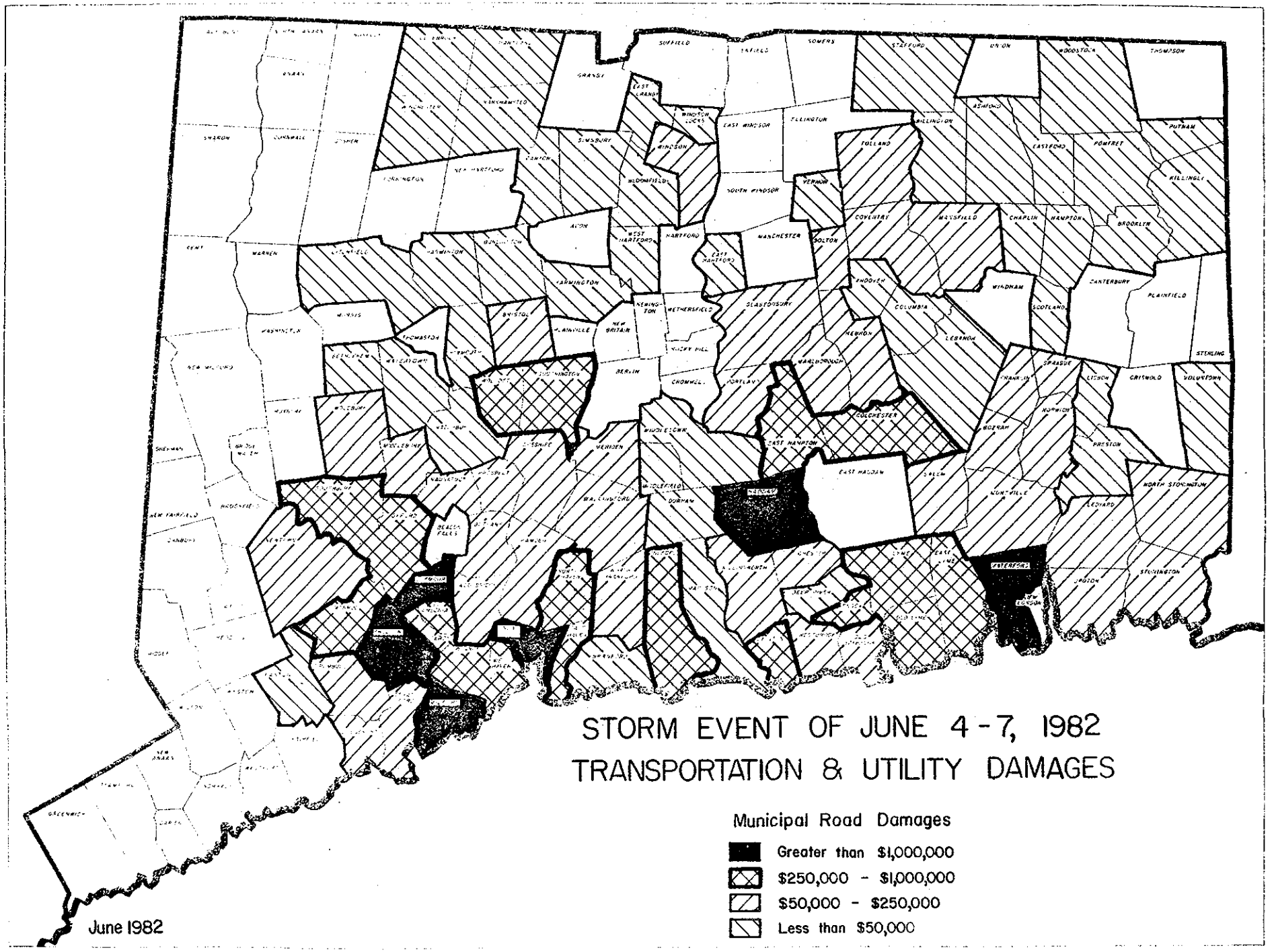

STORM EVENT OF JUNE 4-7, 1982
Dam failures or partially breeched dams
Sewage treatment plant failures or by-passes
Water quality impaired (predominantly due to sewage treatment plant failures)
Shellfish area closures
Areas in which the soil conservation service worked
Damage to public water supply systems greater than $100,000
Damage to public water supply systems $10,000 - $100,000
Damage to public water supply systems less than $10,000
Indicates towns served by public water supply systems which sustained damages or in which a public water supply sourced owned by a system which sustained damage is located. (Actual damage may not have occurred in town in which headquarters of water supply system is located.)
June 1982

Figure 4


STORM EVENT OF JUNE 4 - 7, 1982
TRANSPORTATION & UTILITY DAMAGES
Municipal Road Damages
Greater than $1,000,000
$250,000 - $1,000,000
$50,000 - $250,000
Less than $50,000
June 1982

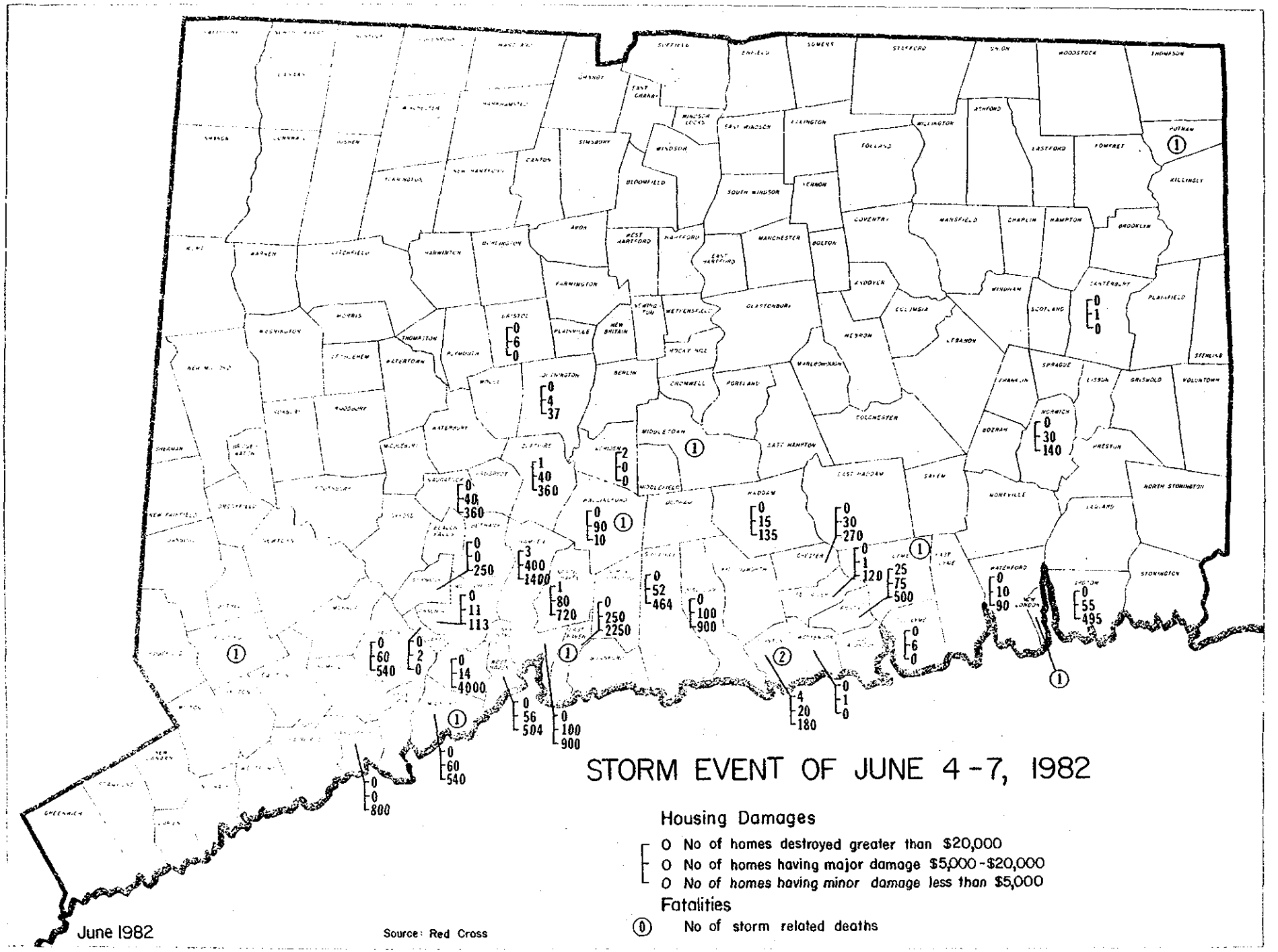
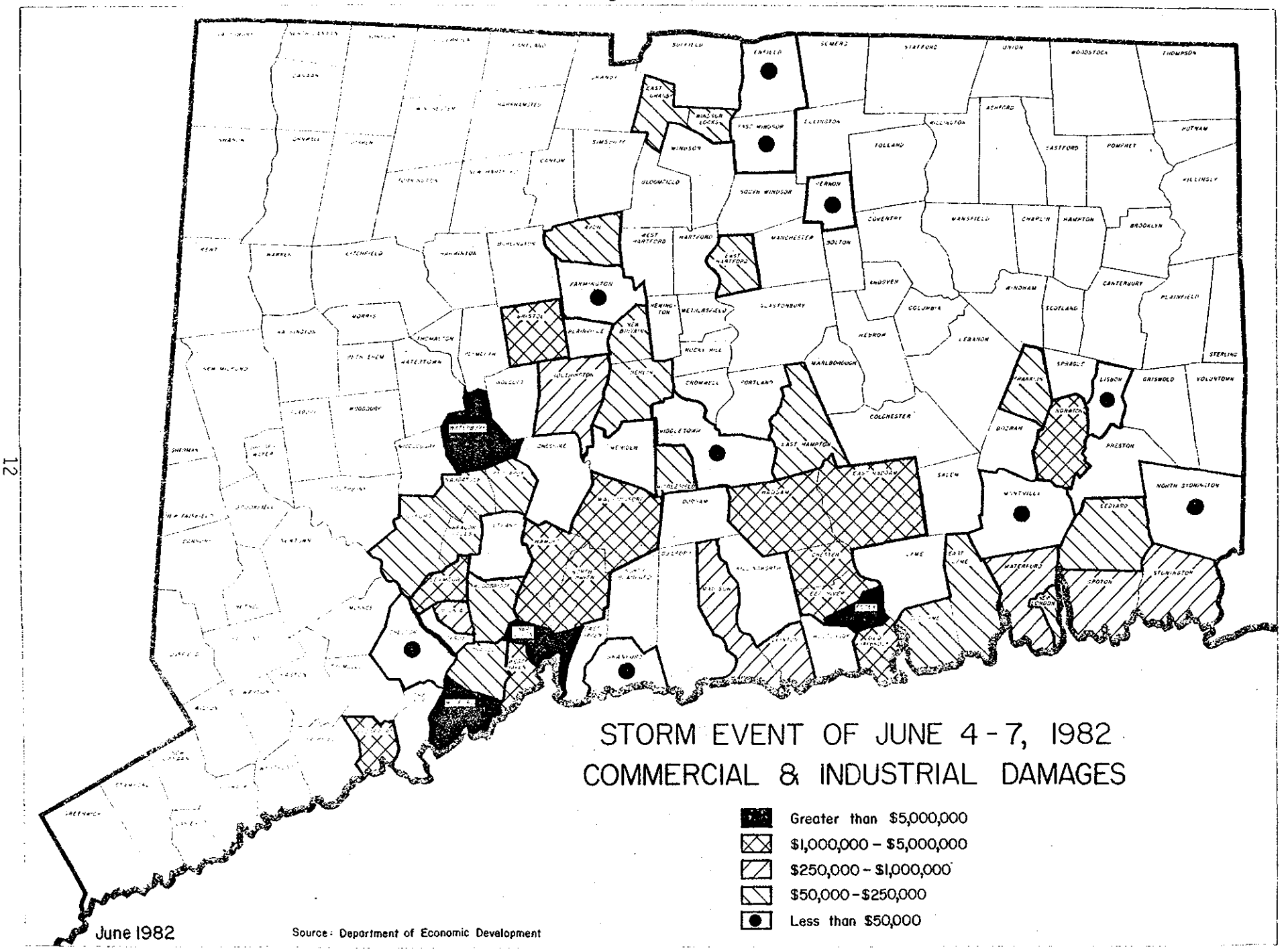

STORM EVENT OF JUNE 4 - 7, 1982
Housing Damages
O No of homes destroyed greater than $20,000
O No of homes having major damage $5,000 - $20,000
O No of homes having minor damage less than $5,000
Fatalities
(0) No of storm related deaths
June 1982
Source: Red Cross

Figure 6


STORM EVENT OF JUNE 4 - 7, 1982
COMMERCIAL & INDUSTRIAL DAMAGES
Greater than $5,000,000
$1,000,000 – $5,000,000
$250,000 – $1,000,000
$50,000 – $250,000
Less than $50,000
June 1982
Source: Department of Economic Development

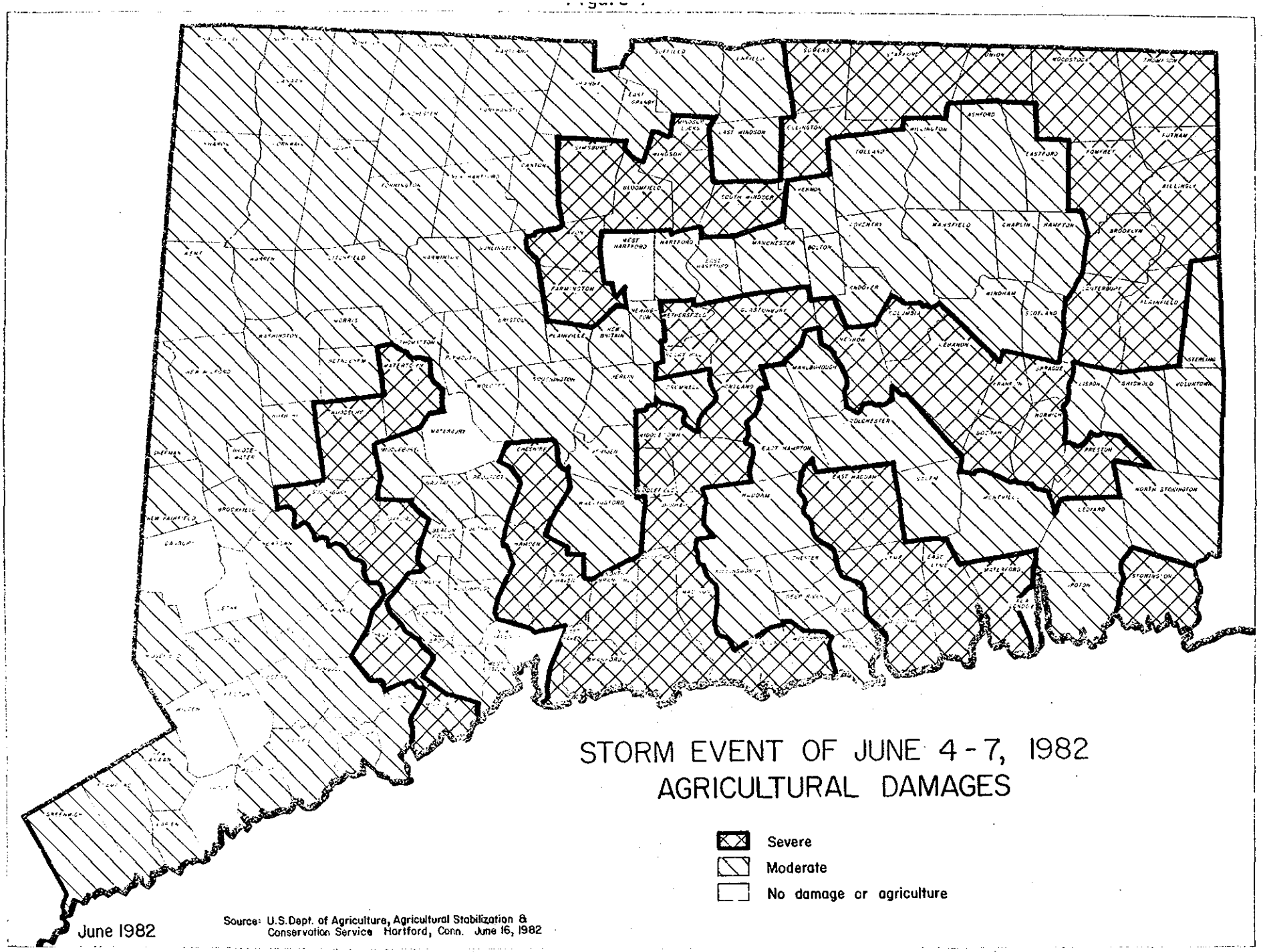
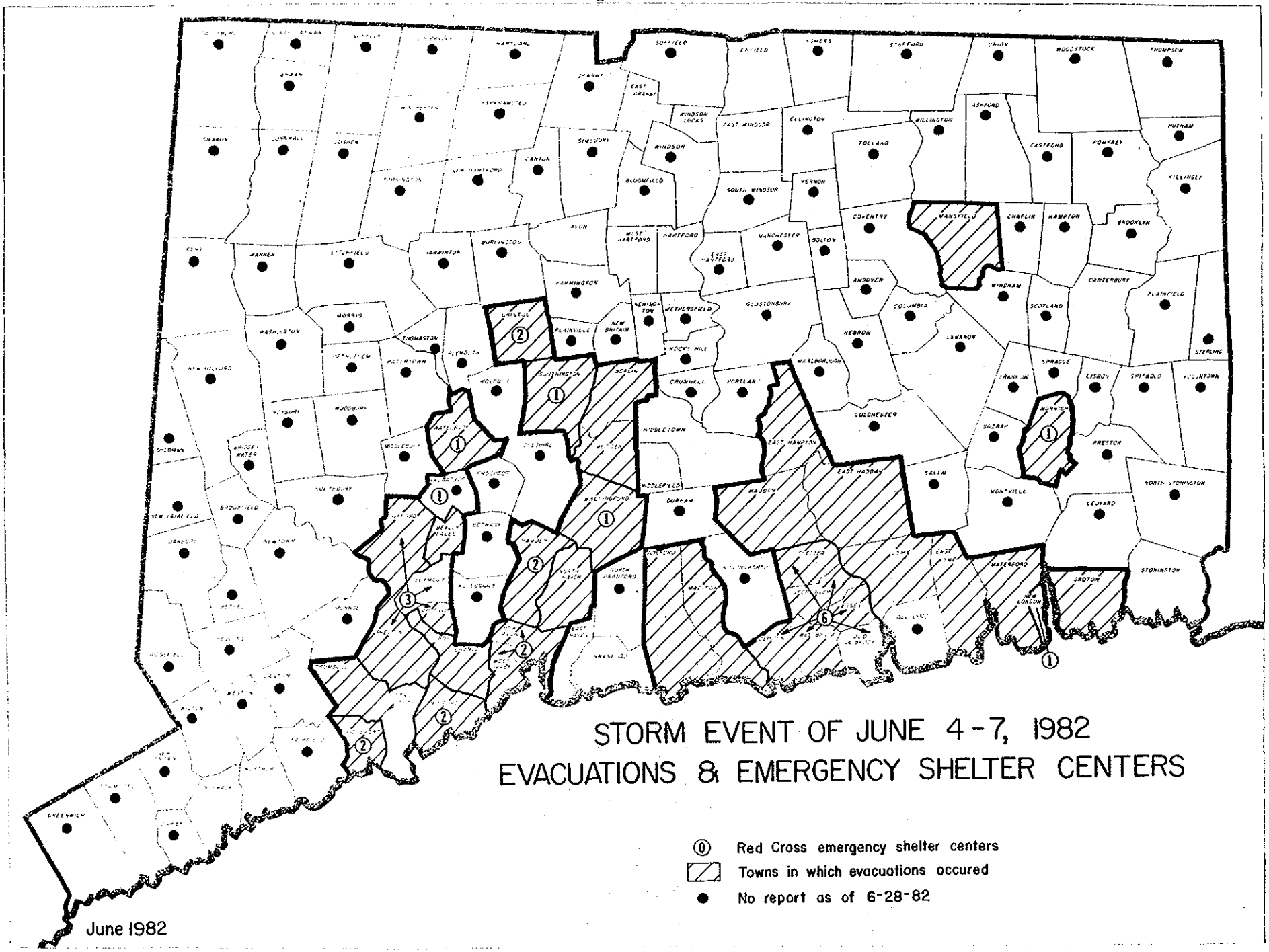

STORM EVENT OF JUNE 4 - 7, 1982
AGRICULTURAL DAMAGES
Severe
Moderate
No damage or agriculture
June 1982
Source: U.S.Dept. of Agriculture, Agricultural Stabilization & Conservation Service Hartford, Conn. June 16, 1982

Figure 8


STORM EVENT OF JUNE 4-7, 1982
EVACUATIONS & EMERGENCY SHELTER CENTERS
Red Cross emergency shelter centers
Towns in which evacuations occured
No report as of 6-28-82
June 1982

5. Snowstorms
6. Droughts
7. Earthquakes

1. Hurricanes

Hurricanes are storms of tropical origin which occur during the summer and autumn months. The most severe hurricane to strike Connecticut this century occurred on September 21, 1938. Flooding, gale winds and coastal storm surge combined to bring about the greatest disaster in the state's history. The storm track resulted in damages being incurred across all of the state, with the greatest devastation occuring in the middle and eastern communities. The shoreline rail and highway transportation systems were inoperative for 3 weeks. Throughout the eastern seaboard the storm destroyed over 9,000 structures, damaged more than 90,000 and resulted in extensive agricultural losses. More than 600 lives were lost and over 1,700 were injured. The damages in Southern New England were estimated to be 300 million dollars (1938). In Connecticut 125 persons died and damages were in excess of 58 million dollars (1938).

Another severe hurricane affected Connecticut on September 14 and 15, 1944. As in 1938, there was damage in almost every section of Connecticut. In this hurricane, however, injuries and storm damage were lower than in 1938 due to ample storm warning. Even with the ample warning, 7 people were killed in Connecticut, with damages of several million dollars (1944). Along the east coast

the total dead numbered 28 and damages were in excess of 30 million dollars (1944).

The next hurricane to hit Connecticut, occurred on August 31, 1954. Hurricane "Carol" tracked across the southeastern corner of the state. Three counties were declared disaster areas. Damages in the remainder of the state were relatively minor. Although Connecticut suffered no fatalities, property damage exceeded 53 million dollars (1954). Throughout New England, "Carol" resulted in 53 fatalities, over 460 million dollars in (1954) damages and destroyed or seriously damaged 10,000 structures and 3,000 boats.

The torrential rains which fell from August 12-19, 1955, were the result of hurricanes "Connie" and "Diane". Flood damage was extreme with multiple road/bridge washouts, town floodings, loss of drinking water, and destruction of power and communication networks. Of the thirty-nine towns severly damaged by flooding, fourteen were declared health hazards. The state, which was declared a disaster area, suffered 70 deaths and 4,700 injured as a result of these hurricanes.

Two months later, on October 15-17, 1955 heavy rains again brought flooding to the state. Although the entire state was affected, 28 towns in the southwestern part of the state were the hardest hit. Over 4,200 families were evacuated because of

flooding, which left 23 dead. Combined with the August 1955 flood, an estimated 1 billion dollars (1955) in damages was sustained.

2. Other Floods

Since there is no distinct flood season, there is scarcely a time of year when Connecticut cannot have a major flood. There are, however, two times of the year with higher flood frequency; late summer and autumn, when hurricanes are likely and early spring, when snow cover is present.

The "Great Connecticut River Flood" of March 1936 was the result of a combination of melting snow and moderately heavy rains over a 13-day period. The flood waters left some 10,000 Connecticut families homeless, contaminated drinking water supplies, brought the threat of thyphoid and resulted in curfews in the flood ravaged communities. This flood left several dead in Connecticut and some 20 million dollars (1936) in property damage. Throughout the northeast, some 170 persons were killed and 300 million dollars (1936) in property damage was sustained.

Scattered, localized flood problems occurred in almost every year due to coastal storms, ice jams, and changes in urban runoff patterns due to urban development. The most recent severe

flooding in the state occurred on June 6, 1982, and is the subject of this report.

3. Tornado

Connecticut has experienced 41 tornado incidents in the period 1953-1982. These incidents have occurred throughout Connecticut in the months from April through October.

The deadliest tornado occurred on August 9, 1878 in central Connecticut. Although damage along its two mile path was limited, it left 34 people dead and injured over 100.

Another deadly tornado occurred in Connecticut On May 24, 1962, in which one person was killed and 34 were injured. The tornado destroyed 70 structures and heavily damaged 175 along its 12 mile path. Total damages exceeded 1.5 million dollars (1962).

The most recent tornado occurred on October 3, 1979. This tornado left 2 dead and 10 seriously injured. It destroyed 12 structures, left 40 uninhabitable and caused an estimated 214 million dollars (1979) in property damages. As a result of this tornado, two towns were declared disaster areas.

4. Coastal Shore Erosion

Two types of events account for Connecticut's shore erosion. One

is the cumulative effort of tides, waves and wave induced currents. The other is the compounding effect of storm surge from large coastal storms. The recurrence interval of these damaging coastal storms is estimated to be 1.14 years.

Based on historical data, approximately 17% of Connecticut's shoreline is critically affected by erosion. Losses from erosion damage and the cost of erosion control measures is now 4.5 million dollars annually. Of this figure approximately 20% is for repair of existing erosion control structures.

The 1938 hurricane caused the greatest recorded damage to the shoreline. The storm track and storm surge combined with the normal high tide to destroy much of the existing shoreline by washing away barrier beaches as well as destroying thousands of shoreline properties.

The hazard from shore erosion becomes severe only when it is coupled with the hazard from hurricanes or other significant coastal storms. In this situation, the resulting disaster may be catastrophic, as was the situation in the 1938 hurricane.

5. Snowstorms and Ice Storms

Severe snowstorms and ice storms can occur throughout Connecticut from November through March. The two heaviest snowfalls occurred

in the state on March 11-14, 1888 and February 1978. The most noted ice storm occurred on December 18, 1973.

The blizzard of February 5, 1978, deposited 12 to 20 inches of snow across the state paralyzing transportation for 3 days and resulting in 5 deaths. As a result of this storm Connecticut was declared a disaster area.

Connecticut's worst ice storm occurred on December 18, 1973. This severe ice storm, which left two people dead, caused widespread power outages lasting several days.

Although most snowstorms in themselves will not cause a disaster, they may produce a potentially disasterous situation. This type of situation occurred in March 1936 when a melting snow cover and extended heavy rains combined to cause the Great Connecticut River Flood.

6. Drought

Two types of drought can occur within Connecticut. Agricultural droughts occur when there is insufficient moisture in the soil to supply the needs of plants. Meteorological droughts occur when there is insufficient precipitation over an extended period of time resulting in the reduction of stream flow, groundwater level, and lake and reservoir storage.

While the agricultural drought of 1957 was the most disastrous to the state's agricultural interests, the meteorological droughts of June 1929-July 1932 and the mid-60s were the most serious. Connecticut experienced its drought of record during the 1960s, which severely restricted the ability of a number of water utilities throughout the state to continue to provide adequate service to their customers. In direct contrast, precipitation was significantly above normal throughout most of the 1970s. This abundance of precipitation helped create a false sense of security among some water suppliers who continued to add to their service areas without enhancing their supplies. This, in turn, led to disruption of local and regional economies due to water shortages in 1980 and 1981.

Other less serious droughts have occurred due to short term reduction in precipitation, and due to increases of users within areas served by water utilitites which are operating at or above their safe yield.

7. Earthquake

Connecticut has a low to moderate level of earthquake activity which has resulted in over 100 earthquakes occurring within the last 400 years. These earthquakes have occurred in all parts of the state with some local clustering in the central and southwestern parts of the state. The most severe earthquakes to occur in Connecticut (including aftershocks) were found to be of

intensity VI, as measured on the Modified Mercalli Intensity Scale. The most recent earthquake of this intensity occurred on November 3, 1968. While being felt by most individuals, this earthquake and ones of this intensity cause only slight damage in poorly built structures. The estimated recurrence interval of earthquakes of this intensity for the Northeastern United States is approximately 9 years. It is possible that larger earthquakes could occur but probabilities for such large events have a low confidence level.

D. Location of Flood Prone Lands and Potential Flood Vulnerability

1. While we have no accurate measure of the acreage of land within flood zones we do know there are flood prone lands in all of the state's municipalities. Over the past few years there have been several studies seeking to identify damageable properties within flood prone areas. These studies, by the U.S. Army Corps of Engineers, the Soil Conservation Service and the State of Connecticut have identified numerous flood hazards:

   a. Housatonic River Basin (Corps of Engineers) - 624 structures (Exclusive of Naugatuck River Basin).

   b. South Central Connecticut Coastal Basin (Soil Conservation Service; excluding municipalities directly abutting coastline) - 1340 structures.

c. Connecticut Coastline (CT DEP) - 34,679 structures.

Approximately three-fourths of these structures are within the 100-year flood zone. No inventory has been conducted for the Connecticut, Thames, Southwest Coastal, Southeast Coastal, Pawcatuck and Hudson river basins.

2. Other indicators of the state's flood problem are:

a. There are flood prone lands in every municipality.

b. The value of flood insurance policies in force is nearing $800,000,000.

c. Seventy-four municipalities each have over $1,000,000 of flood insurance policies in force.

d. The U.S. Army Corps of Engineers estimates average annual damages at $40-50,000,000 for Connecticut.

III. PROBLEM IDENTIFICATION

A. Damage in the June 1982 flood:

1. Trends

a. Homes and businesses outside of the 1 percent floodplain but downstream of dams that failed.

b. Homes and businesses within the 1 percent and in some cases, .02 percent floodplains.

c. Roads, bridges, and culverts.

2. Site Specific Damage

Preliminary information for the communities of Bridgeport, Cheshire, Essex, Franklin, Haddam, Hamden, Milford, New Haven, North Branford, Norwich, Seymour, Trumbull, Wallingford is included in the "Interagency Flood Hazard Mitigation Report." [1]

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[1] A detailed historical documentation of what happened, who was involved, and what costs and losses occurred is expected to be published in the fall of 1983.

B. Cause of damage:

1. Dam failures.
2. Development in flood zones, principally prior to flood insurance program requirements.
3. Undersizing of culverts or bridges.
4. Inadequate urban storm drainage systems.
5. Debris constriction of bridges, culverts, and channels.
6. Changes in peak flows due to general urbanization.
7. Limited effectiveness of existing warning system.[1]

C. Other hazards evaluation:

Flood mitigation measures may reduce or be affected by hurricane flooding, coastal shore erosion, and drought hazards.

Hurricane flooding is likely to cause severe damages to coastal facilities from the direct onslaught of waves and elevated coastal waters. Coastal shore erosion processes will often increase susceptibility of damage from hurricanes or coastal storms. Drought emergencies underscore the need for new drinking water supplies, some of which may be obtainable by modifying flood control projects. Similiarly, use of water supply reservoirs for flood storage may mitigate flood problems.

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[1] The limited effectiveness is due to the delay in getting actual precipitation and river levels, not due to inaction of warning or emergency agency personnel, both of which were highly praised for their action.

IV. INVENTORY OF EXISTING MITIGATION MEASURES

There are a significant number of federal, state, and local programs, and an even larger number of statutes involved with flood management in Connecticut. About twenty federal and state departments have some flood related jurisdiction; but a much smaller number provide the nucleus of our flood management efforts. These agencies are described below. There have been about $300,000,000 of flood control projects spent in Connecticut since 1950; and annual agency costs for flood control project maintenance and floodplain regulation is about $4,000,000 per year, exclusive of local costs for floodplain regulation and management.

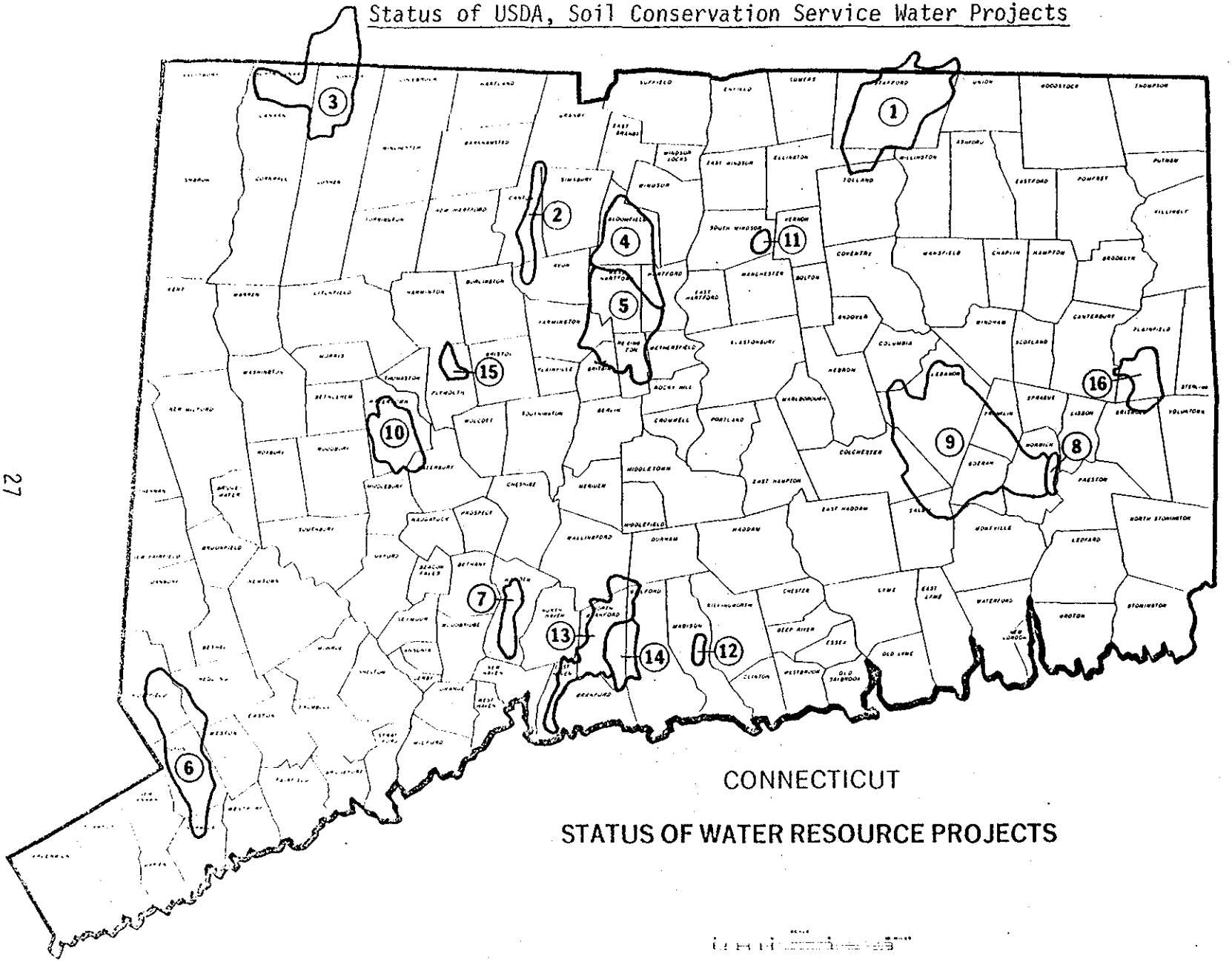
A. Federal

1. The United States Department of Agriculture Soil Conservation Service (SCS)

Prior to the June event the SCS provided significant flood assistance. Figure 9 depicts the status of SCS projects, most of which have been conducted under PL-566 authorization.

FIGURE 9

Status of USDA, Soil Conservation Service Water Projects



CONNECTICUT

STATUS OF WATER RESOURCE PROJECTS

a. PL-566

The Watershed Protection and Flood Prevention Act, Public Law 83-566 Stat. 666 authorizes "the Secretary of Agriculture to cooperate with states and local agencies in the planning and carrying out of works of improvement for soil conservation and for other purposes." It provides for technical and financial assistance by the Department through the Soil Conservation Service (SCS) to local organizations representing people living in small watersheds (less than 250,000 acres). The Act provides for a project-type approach to solving land, water, and related resource problems. Flood prevention is an eligible purpose for which SCS can pay 100 percent of the costs for planning studies, design and construction of structural solutions. The local sponsoring organization is responsible for land rights, operations, and maintenance. Often these costs are equal to one half the total costs of the project. Nonstructural costs for implementation are divided 80 percent federal and 20 percent nonfederal.

The status of projects not "completed" in Figure 9 is as follows:

- South Branch Park River: Four floodwater retarding structures have been completed: Deadwood Swamp, a natural flood storage area, has been purchased by the state and kept as multi-purpose open space; the majority of the channel work has been completed; the Trout Brook Channel construction is underway, and coordination is underway for the Piper and Mill Brook channel in Newington. There are no anticipated problems in ensuring completion of this project.

- Norwalk River: Two of the five planned floodwater retarding structures have been completed. The construction of the next structure cannot proceed until U.S. Route 7 is relocated which was anticipated in 1965 when The Watershed Plan was developed. The Relocation of Rte. 7 is presently a low priority with The Connecticut Department of Transportation. During the 1983 legislature session DEP has testified several times on behalf of bills to support the Route 7 project. SCS has indicted that unless positive action is taken prior to September 1983 the project will be declared inactive. Potential damage from the occurrence of a 100-year frequency flow are estimated at $16,000,000.

- Farm Brook: This project is substantially completed with the construction of three multi-purpose floodwater retarding structures. The remaining items include the development of recreational facilities at one site and the construction of 1.1 miles of channel work; the latter of which has been

delayed while SCS, DEP and the Town work out some controversial issues. The problems are anticipated to be resolved by September 1983.

- Yantic River: (See also Norwich and Franklin in the Municipal Section of this report). Planning was authorized for this watershed in December of 1966. The selected alternative included the construction of two floodwater retarding structures, a multi-purpose structure and 1.3 miles of channel work. The two upper-watershed towns in which the structures would be built withdrew their support in 1976 preventing implementation of this project which is designed to protect the lower watershed towns of Franklin and Norwich. The watershed was re-examined by SCS in April of 1983 in an attempt to find a justifiable structural/non-structural solution which may be acceptable to all the communities affected. The SCS will provide a detailed plan when DEP is able to implement a non-structural plan.

- Steel Brook (Watertown): An application was submitted for a PL-566 investigation of this watershed in 1967. Following a flood in 1975 the SCS undertook some emergency watershed protection work under their section 216 authority. This work provided some indirect relief from the frequent flood events. A detailed investigation will be requested by DEP under the SCS PL-566 program in the near future. The U.S.

Army Corps of Engineers is examining Turkey Brook which is a Tributary of Steel Brook.

- Avery Brook: Principal problems in this watershed are floodwater damages to residential properties and roads. Two floodwater retarding structures are to be built, one of which may include a permanent pool, and several homes are to be floodproofed. Significant progress has been made to date implementing land treatment measures in the upper watershed and it is anticipated that one floodwater retarding structure will be put out to bid in the fall of 1983.

- Farm River: A planning report published in September 1980 explained the alternatives, described the major impacts and depicted estimated costs. The Town of North Branford, the upper watershed community where a floodwater retarding structure is proposed to be constructed, has not yet accepted the selected alternative. DEP will coordinate with North Branford in an attempt to encourage acceptance of the project by September 1983. As in the Yantic River project, the majority of the damages are in the lower watershed, but the communities in the upper watershed are unwilling to accept flood retarding structures.

- Upper Branford River: This watershed is presently under investigation under the Central Coastal River Basin Study.

- Upper Pequabuck River: The termination of this project is presently underway as an economically justified solution cannot be found due to development within the proposed site of a floodwater retarding structure.

- Mill-Horse Brook: A pre-application report was completed in May of 1980 which identified a non-structural solution as the only feasible alternative to solve the flooding problems. An application was submitted by DEP in June of 1981 and planning was authorized in September of 1981. The final plan is scheduled to be completed in November of 1984 with no anticipated problems.

b. USDA Cooperative River Basin Studies

Cooperative river basin studies are made under the authority of Section 6, Public Law 83-566 the Watershed Protection and Flood Prevention Act. This law authorizes the Secretary of Agriculture to cooperate with Federal, State, and local governments in appraising water and related land resources and formulating alternative plans for conservation, use, and development. Plans may include management and land treatment measures, nonstructural measures, structural measures, or combinations thereof that would meet existing and projected needs and objectives. This program provides planning information which can be used for implementation of PL-566, RC&D, state, and/or local projects. The USDA Soil

Conservation Service, Forest Service, and the Economic Research Service, in cooperation with the Connecticut Department of Environmental Protection are studying flooding problems in 12 watersheds within the Central Coastal Basin.

- Central Coastal Cooperative River Basin Study: This River Basin Study is examining small flooding problems, possible solutions and resultant impacts within the 304,000 acre basin. The Study will also include effects of development, effects of wetland and floodplain encroachment, possible management of existing structures for flood control and stormwater management options. Completion of the study is scheduled for September 1984. The following areas will receive a detailed study: Harber Brook/Meriden, Quinnipiac River/Southington, Quinnipiac River/Cheshire, Quinnipiac River/Wallingford, Muddy River/North Haven, Wallingford; Munger Brook/North Branford. The following areas will receive a limited study: Cove River/West Haven, West River/New Haven, Munenketesuck River/Clinton, Indian River/Milford, Orange, East River/Guilford and Bailey Brook/Madison. Completion of this report will provide specific inventory information, evaluate the location and magnitude of problems, define feasible alternative solutions, analyze the impacts of the alternatives, and enchance interagency plans and programs so that the time

required for detailed implementation studies can be reduced. Appropriate action will be taken by DEP at the completion of the study to insure that all recommendations are addressed.

Prior to the June flood DEP and SCS were planning to investigate the Pequonnock River watershed in Trumbull and Bridgeport where flooding causes damages to residences, business, heavily developed commercial areas, a town park and some roads. The preliminary investigation has been completed with several possible alternatives evaluated and it was determined that a justifiable SCS project did not exist. DEP has requested the U.S. Army Corps of Engineers to update and reevaluate a flood control, water supply and recreation plan developed in the 1960's. Pending outcome of the reevaluation, DEP will pursue implementation of a Corps of Engineers program or encourage the local municipalities to undertake a state/local flood control project.

c. Emergency Watershed Protection

The Emergency Watershed Protection Program (EWP) is administered by the Soil Conservation Service under section 216, Public Law 81-516 and Section 403 of Title IV of the Agricultural Credit Act of 1978, Public Law 95-334.

The objective of the program is to assist in relieving imminent hanards to life and property from floods and the products of erosion created by natural disasters. Corrective measures must prevent flooding or soil erosion, reduce threats to life or property, and yield benefits to more than one individual. Authorized EWP technical and financial assistance may be made available when an emergency exists. Federal funds may bear up to 100 percent of the construction costs of emergency measures in an exigency situation and 80 percent in a nonexigency situation. Sponsors are responsible for obtaining any needed land rights. These emergency measures were used in the June flood.

d. Floodplain Management Studies

SCS assists State agencies and communities in the development, revision, and implementation of their floodplain management programs by carrying out cooperative floodplain management studies (FPM's) in accordance with federal Level Recommendation 3 of "A Unified National Program for Floodplain Management, and Section 6 of Public Law 83-566.

FPMs identify site specific flood problem areas, inventory natural values, incorporate public participation, study the community's management alternatives, and provide for study

follow-up assistance. An FPM may serve as the source of technical data for the community to implement a local floodplain management program. Implementation programs such as PL-566, RC&D, or the Connecticut Flood Management Program are needed to install structural or nonstructural (such as floodproofing, raising, or acquisition) measures. Two floodplain management studies are planned for 1985.

e. Resource Conservation and Development

The Resource Conservation and Development (RC&D) Program was authorized by the Food and Agriculture Act of 1962. It expands opportunities for conservation districts, local units of government, and individuals to initiate flood management projects.

Flood prevention measures are planned and are being carried out where there is a need for reducing or preventing water damage from inundation of property, businesses and other areas resulting in a situation hazardous to health, and security and/or threatening the loss of life. RC&D may provide up to 100 percent of construction costs. Four watersheds are currently under study.

f. Streambelt Corridors

Streambelt Corridors are delineated by a technical

assistance effort under the SCS conservation program, and the RC&D program. Streambelt Corridors that are identified, delineated and regulated to prevent building and other forms of encroachment have been found to be an effective way to prevent damages due to flooding.

2. United States Army, Corps of Engineers (CE)

The Corps of Engineers, as SCS, has provided significant flood assistance. Figure 10 depicts completed flood, hurricane, and shore erosion projects. Figure 11 depicts the value of these projects in damage prevention. Figure 12 depicts CE flood study and control programs.

In addition to the activities depicted in figures 10 and 11, the following studies were underway; or had been completed by June of 1982:

- Bradley Rock Beach, West Haven: This is a city owned beach and is open to the public. At mean high water the average dry beach width is 5 feet. Progressive erosion has resulted in a lack of adequate dry beach space. Local interests have become increasingly concerned about the erosion problem at this public beach as they have experienced an increase in beach use and are projecting this increase to continue in the very near future. The Bradley Beach study, intended to find solutions to the erosion problem, has been combined with the Sea Bluff Beach investigation.

- Sea Bluff Beach, West Haven: Over the years Sea Bluff Beach has experienced the loss of valuable recreational beach space due to storm driven waves and winds. The average rate of erosion of Sea Bluff Beach is 2.0 feet per year and has experienced up to 5.0 feet in any one year. This erosion is particularly severe during storms that last over several tide cycles with elevations

Figure 10

Authorized Federal Projects of the U.S. Army Corps of Engineers

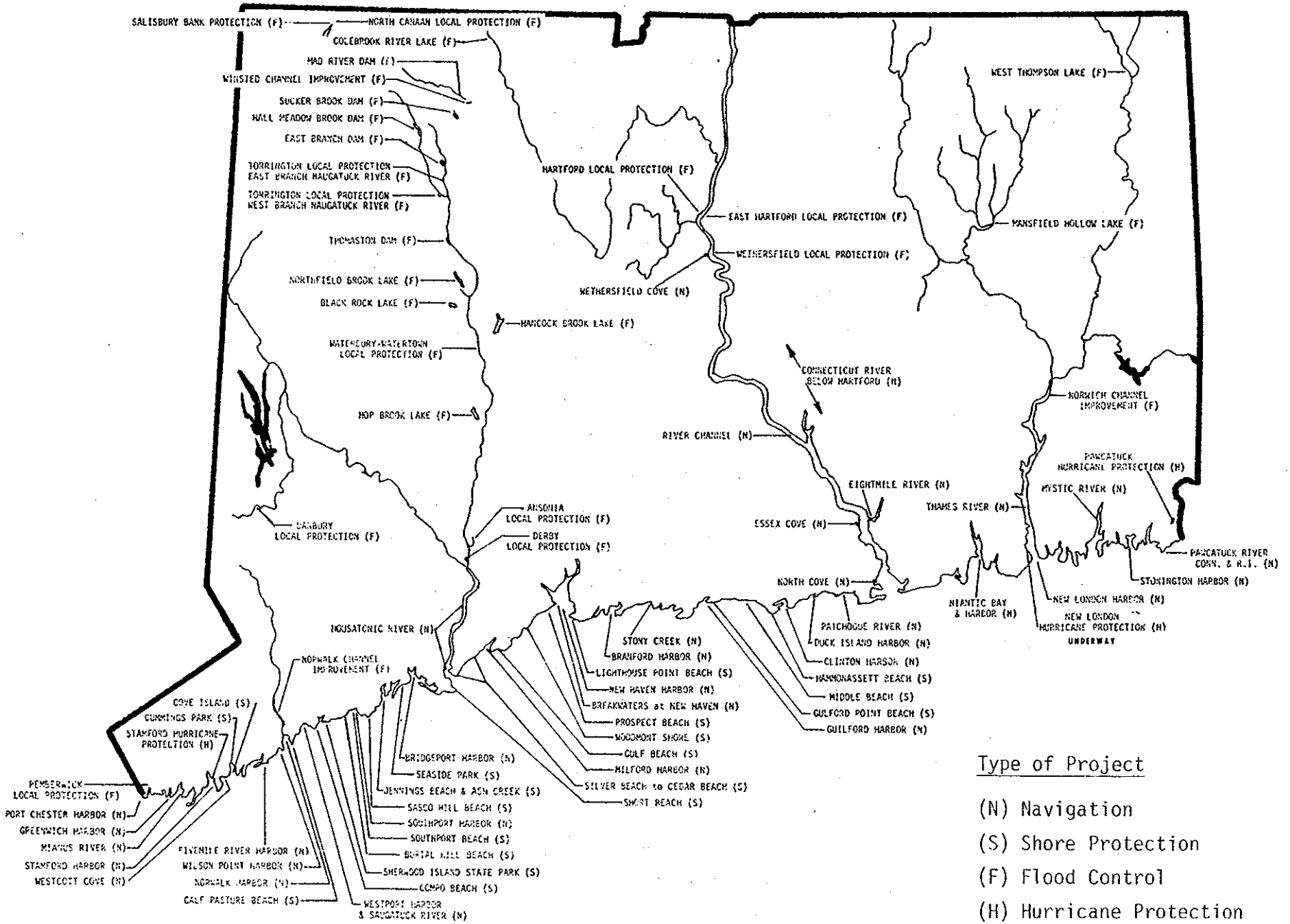


FIGURE 11

U.S. Army Corps of Engineers Connecticut Project Benefits

Project	Damages Preventable In Recurring Record Flood	Date of Record Flood
FLOOD CONTROL		
Connecticut Western Coastal Area		
Norwalk River	$ 3,105,000	1955
Pemberwick Local Protection	1,326,000	1955
Housatonic River Basin		
Ansonia Local Protection	106,662,000	1955
Black Rock Lake	30,711,000	1955
Danbury Local Protection	12,422,000	1955
Derby Local Protection	12,249,000	1955
East Branch Dam	22,084,000	1955
Hall Meadow Brook Dam	60,908,000	1955
Hancock Brook Lake	24,671,000	1955
Hop Brook Lake	21,738,000	1955
North Canaan Local Protection	-	1955
Northfield Brook Lake	11,214,000	1955
Thomaston Dam	532,770,000	1955
Torrington East Branch Local Protection	1,767,000	1955
Torrington West Branch Local Protection	948,000	1955
Waterbury-Watertown Local Protection	-	1955
Connecticut River Basin		
Colebrook River Lake	53,829,000	1955
East Hartford Local Protection	13,290,000	1936
Hartford Local Protection	106,290,000	1936
Mad River Dam	68,149,000	1955
Park River Local Protection	20,703,000	1955
Sucker Brook Dam	7,419,000	1955
Winsted Local Protection	-	1955
Thames River Basin		
Mansfield Hollow Lake	56,072,000	1938
Norwich Channel Improvement	6,038,000	1955
West Thompson Lake	17,944,000	1955

FIGURE 11 (Continued)

U.S. Army Corps of Engineers Connecticut Project Benefits

Project	Damages Preventable In Recurring Record Flood	Date of Record Flood
HURRICANE FLOOD PROTECTION		
Connecticut Western Coastal Area		
Stamford Hurricane Protection	14,836,000	1938
Thames River Basin		
New London Hurricane Protection	10,697,000	1938
Pawcatuck River Basin		
Pawcatuck Hurricane Protection	3,451,000	1938

Figure 12

CORPS OF ENGINEERS FLOOD STUDY & CONTROL PROGRAMS

FEATURE \ PROGRAM	COMPREHENSIVE STUDIES	SMALL PROJECT STUDIES	TECHNICAL SERVICES	REIMBURSABLE WORK
AUTHORIZATION	Congressional Resolution or Legislative Enactment	PL 80-858, Section 205	PL 86-645, Section 206	PL 90-577, Section 302
QUALIFYING CRITERIA	None	-Requires legally empowered local sponsor -$4,000,000 total Federal cost limitation -Flooding source flow 800 cfs (10 year) -Economic justification	Flood related problems	-Corps must have "special competence" -Cost efficiency
APPROVALS	Congressional authorization & appropriation for construction, operation & maintenance	-Office of Chief of Engineers approves Detail Project Report (DPR) and funds construction -Appropriation approval	-Local Corps of Engineers office -Must be within overall budget allotments	-Division or District up to $15,000 -Chief of Engineers over $15,000
NATURE OF WORK	-All water resource applications -Reconnaissance, survey & feasibility study stages -Design, construction, operation & maintenance with additional Congressional approvals	-Flooding problems only -Reconnaissance, DPR, plans & specifications, construction -Project turned over to local sponsor for operation & maintenance	-Entire range of flood damage reduction measures -Study work only, no design or construction	-Any water resource activity for which Corps has expertise and resources -Work limited to study and design
STUDY TIMEFRAME	-3 years through feasibility -Additional time (years) for approvals & construction -10 years overall is typical	-Recon: 2 months -DPR: 16 months -Construction: 20 months	Usually less than one year	-Unconstrained -Negotiable between parties
COST SHARING PROVISIONS	-Reconnaissance: 100% Federal -Survey & Feasibility: 50% Federal -Design & Construction: 65% Federal for structural flood control works; 80% Federal for non-structural flood control; 100% non-Federal for vendable products (hydro & water supply)	-Recon: 100% Federal -DPR: 65% Federal -Construction: Structural 65% Federal; Non-Structural minimum 80% Federal	100% Federal	-100% Non-Federal -Contractual basis

above normal still water elevations. Several plans of improvement will be designed and considered to help provide more beach space and to help protect the beach and backshore. This study has been combined with the Bradley Rock Beach investigation with a detailed project report scheduled to be completed in June of 1985.

- Housatonic Urban Study: This study was initiated in October of 1977, and was completed in October of 1980. The study investigated the water resources problems, primarily water supply and flood control, in and around the Housatonic Basin. Examination of the floodplains in the study area showed some significant potential damage areas.

Several solutions to the potential flood problem areas were evaluated. Structural measures such as dams, diversions, and dikes, and nonstructural measures such as floodproofing, flood warning, and evacuation and relocation were investigated in detail. Due to the dispersion and low concentration of structures in damage areas, nonstructural measures were found to be the most feasible. Flood management plans were identified for 14 communities and were studied in detail under the urban study's authority. Further study, which could lead to Federal implementation, can be continued under the Section 205 small projects authority if there is local interest in such studies.

- Flood Hazard Evaluation: Seymour and Fairfield, Connecticut.

This pilot research study was conducted to (1) field test the accuracy and cost effectiveness of a stage-damage computer program developed by the Chicago District, Corps of Engineers; (2) determine flooding levels and associated damages within the communities; and (3) assess the applicability of the program in the New England Region.

- Rippowam River Basin - Flood Damage Prevention Study: Based on economic feasibility, environmental considerations and public acceptance, two alternative plans have evolved and are being considered for final selection: A primarily structural plan and a primarily nonstructural plan. The structural plan would consist of a 1.8 mile long, 20-foot diameter bypass tunnel constructed more than 100-feet below ground. The plan would have a total cost of about $39 million and provide complete protection from floods up to the 100-year event. The nonstructural plan would consist of the replacement of several bridges which currently obstruct flood flows, the replacement of Mill Pond Dam with a Bascule control gate and an automated flood warning and emergency evacuation system. This plan would have an initial cost of about $2 million. Although this plan provides only limited protection it does significantly reduce damages in those areas most prone to flooding. The study is scheduled for completion in Fiscal Year 1983.

3. The Federal Emergency Management Agency (FEMA)

FEMA sponsors major flood related programs by the Federal Insurance Administration, the National Preparedness Programs Directorate and the State and Local Programs Directorate.

a. The National Flood Insurance Program

This program seeks to limit flood losses and the significant federal cost related to those losses by requiring communities to properly manage floodplain development. This is accomplished by: (a) conducting detailed engineering studies of most water courses, (b) delineating floodways and floodway fringes showing flood conveyance and storage areas, (c) requiring communities to adopt floodplain management regulations, (d) subsidizing insurance for structures already in flood risk areas, (e) requiring insurance at acturarial rates for new structures proposed for flood risk areas, (f) tying the availability of disaster relief programs, federal grants and loans and federally backed mortgages to a community's willingness to participate in the program, and (g) requiring lending institutions to notify the purchaser or lessee of special flood hazards in advance of the signing of purchase or lease agreements. As of August 1983, all communities in Connecticut participate in the program.

b. Civil Preparedness Activities are funded in part by FEMA

These programs are described in detail in the "State" section.

c. State and Local Programs

These provide disaster response and recovery, as well as funds for the "State Assistance Program" (also described in the State section).

4. The United States Department of Commerce, National Weather Service

The Northeast River Forecast Center is responsible for issuing flood and flash flood warnings, and for developing local flood warning systems. By June of 1982 only a few communities had such local systems.

5. Executive Order 11988

Requires federal agencies to evaluate the potential effects of any federal action which may affect floodplains, and to eliminate or reduce any negative effects of that action. The State of Connecticut has, and continues to strongly endorse this Executive Order.

B. STATE AGENCIES

1. Office of Civil Preparedness

Title 28 of the Connecticut General Statutes created the State Office of the Civil Preparedness and charged it with developing the civil preparedness program of the state. Civil preparedness can be thought of as any activity or measure undertaken to minimize the effect of a major disaster or attack upon the civilian population.

The Office of Civil Preparedness develops and maintains various emergency operations plans for state government and provides technical planning assistance to communities as requested or as necessary. The agency also offers training for State and Local civil preparedness personnel and develops and conducts emergency operation drills and exercises.

In times of disaster or emergency, the State Office of Civil Preparedness disseminates warnings and alerts key state, federal and private response organizations. The agency also acts as a coordinating agency by soliciting and passing pertinent disaster or emergency information to appropriate government and private disaster response organizations.

The State Office of Civil Preparedness administers several State-Federal programs designed to help communities develop and improve their civil preparedness stature. The following programs provide assistance that is especially applicable to flood hazard preparedness.

a. Emergency Management Assistance Program (EMA)

This program is intended to develop effective civil preparedness organizations in the community in order to plan for and coordinate emergency activities in the event of a disaster.

To accomplish this, formula grants are available on a matching funds basis for necessary and essential civil preparedness personnel and administrative expenses, including costs of travel, office supplies and equipment, rent and maintenance of office space, utilities and insurance.

b. Support Materials

This program is intended to increase the emergency readiness of local governments by furnishing matching funds for procurement of emergency equipment.

To accomplish this, project grants are available on a matching funds basis for purchase of emergency equipment to establish alerting and warning, direction and control, radiological defense, emergency services and emergency public information systems. The Office of Civil Preparedness maintains the State weather warning radio transmitter operated by the National Weather Service.

c. Emergency Operations Centers (EOC's)

The purpose of this program is to develop effective civil preparedness facilities in a community in order to coordinate emergency activities in event of disaster.

Project grants are available to help provide protected emergency operations facilities with adequate space and power.

d. Emergency Operations Plans (EOP's)

The Office of Civil Preparedness is responsible for maintaining the State Emergency Operations Plan. Revisions are made as necessary but not less frequently than every 2 years.

The current State Emergency Operations Plan was published in 1978 and was revised in 1979 and 1981 with another revision

scheduled for this year, 1983. However, the 1983 revision may be delayed due to IEMS (Intergrated Emergency Management System), beginning in October 1983.

IEMS is a new federally mandated approach to emergency planning, which will require state and local governments to conduct comprehensive hazard analyses prior to development/revision of emergency operations plans.

Presently, the basic Emergency Operations Plan covers all forms of emergencies. One component of the E.O.P. is the Natural Disaster Plan which is prepared for hurricanes, floods, tornados, ice storms, and the like. The Relationship of State and Natural Disaster Plans and annexes is shown in Figure 13.

e. Emergency Operation Plans

These are required for all potentially hazardous dams to protect downstream lives and property. Dam owners are responsible for the formulation of these plans and the implementation of procedures contained therein. Necessary elements of an effective E.O.P. are as follows:

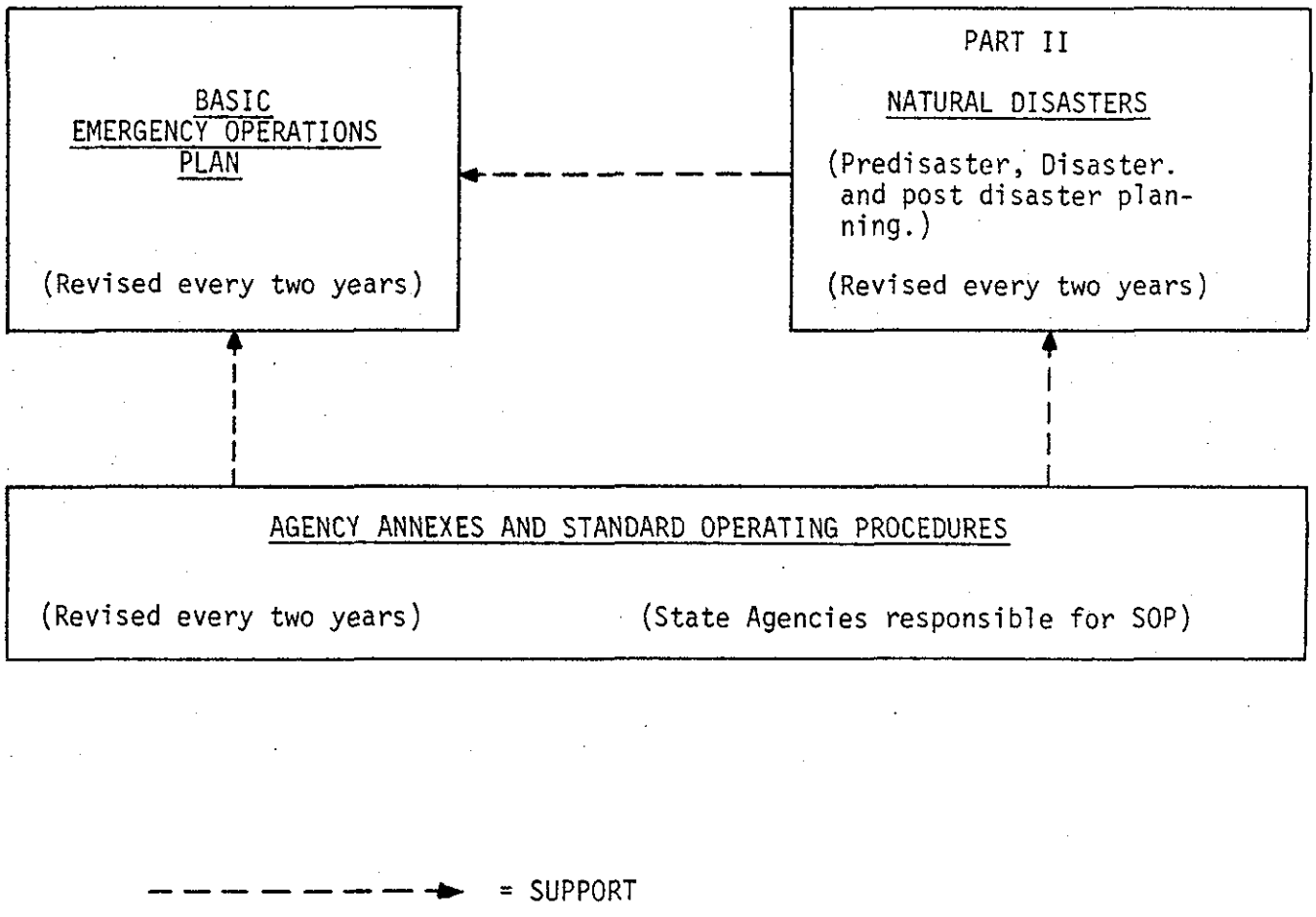
1. Monitoring of the dam site during periods of heavy rainfall and run-off.

2. An inundation map which identifies areas affected by dam failure.

3. Early warning and evacuation procedures that have been established and coordinated with local officials (chief executive, police, fire, civil defense, etc.) and affected downstream residents.

FIGURE 13

RELATIONSHIP OF STATE NATURAL DISASTER
PLANS AND ANNEXES



Currently, the Department of Environmental Protection requires an E.O.P. to be established for those dams inspected under the National Program of Inspection of nonfederal dams conducted by the Army Corps of Engineers.

f. The Connecticut State Warning System

The Connecticut State Warning System consists of four interrelated warning networks.

The National Warning System (NAWAS) has 21 towns in the system. These towns are responsible for conveying warnings or watches to all towns in their region, thereby obtaining 100% coverage of the state. Warnings and watches are retransmitted on the other parts of the system.

The State Police computerized teletype system reaches 92 towns and is used to relay NAWAS messages; fan out can be requested on this system.

The State Fire Radio Network Control Station monitors NAWAS. This station broadcasts watches and warnings, monitored on the NAWAS, to 14 stations which can rebroadcast on the county fire networks.

The three National Weather Service transmitters also announce watches and warnings to receivers throughout the

state. A tone-alert signal is used to activate "alert-receivers."

The National Weather Service enters the State NAWAS circuit for weather watches and warnings and is authorized to access the Master Control Station of the Emergency Broadcast System.

Backup warning capability is, therefore, available to all jurisdictions. The system is also flexible in that the National Weather Service, the State Police Primary Warning Center, and towns can access the system by more than one means of communication.

The system is considered highly effective. Deficiencies have been identified and are being addressed, but the only significant deficiency is in the timeliness of receiving precipitation information. An automated flood warning network would help to overcome this deficiency.

2. Department of Environmental Protection (DEP)

The DEP is the principal flood management agency in the state, and within the Department, the Water Resources Unit is the principal unit for flood management. Other units assisting include the Natural Resources Center, the Planning and Coastal

Management Unit, and units of the Division of Conservation and Preservation. The Department's responsibilities include planning, regulation and/or management of tidal, coastal and navigable waters; tidal and inland wetlands and watercourses; subaqueous marine mining; stream channel encroachment lines; diversion of water; dams; flood control project development; coordination with local and Federal interests for flood control, shore erosion control, soil and water conservation, and other water resource and flood management activities.

The DEP is involved with many flood programs. The most important of which are described below.

a. The Connecticut State Building Code (Section 743.0)

Provides mandatory construction standards for structures located in flood hazard areas. The Code is not administered by DEP, but the flood related sections provide for DEP oversight of any variations in the standards.

These standards set the elevation requirements and anchoring standards for development in flood zones as required by the National Flood Insurance Program. The Building Code has more stringent standards for velocity zones; it requires elevation of the lowest structural member above the 100-year stillwater flood elevation plus the maximum wave height

(minimum addition of 3 feet). Eventually all coastal communities will have a base flood elevation that includes the effect of wave action. In the interim, the Building Code insures that new structures and substantial improvements in velocity zones will be elevated to account for the maximum wave height.

Prior to exemption of any structure from the standards of Section 743.0, the local building inspector must obtain DEP approval. This allows for direct state oversight of floodplain development. The approval/denial process utilizes subpart 60.6 of the National Flood Insurance Program regulations. The review process is coordinated with all state agencies having an interest in the decision.

FEMA and the DEP initially requested that all the minimum regular phase NFIP development standards be incorporated into the Building Code. The intent of that request was to mandate statewide adoption of the minimum NFIP standards and eliminate the necessity of municipalities to adopt additional ordinances or amend regulations in order to continue participation in the NFIP. The State Building Code Standards Committee determined that many of the standards were not suitable for inclusion within the code. Consequently, many of the minimum NFIP standards were not included. DEP has continued to communicate with the

Standards Committee in an effort to incorporate as many NFIP standards as applicable. DEP will continue this effort.

Recent initiative under this program has resulted in the development of an exemption request form to be utilized by the local building inspector in cooperation with the applicant. The form contains background and introductory information as well as the criteria which will be considered. The completion of the required information will ensure that the exemption is justified.

b. The Coastal Management Program

The Coastal Management Program has identified flood hazards as an issue at the federal, state and local levels. In response to this issue the Connecticut Coastal Management Act specifically identified increasing the hazard of coastal flooding as an adverse impact to be avoided during development of coastal areas. As part of Planning and Zoning procedures municipalities must now undertake coastal site plan reviews to consider the impact of all development proposals within the coastal boundary on coastal resources. Municipalities are also encouraged to develop coastal programs by revising existing town plans and ordinances to assure long-range consistency with coastal policies. In 1981, a Costal Flood Hazard Area Study identified twenty

developed beachfront sites subject to severe flood and wave damage; evaluated the potential for local or state management; and made recommendations to the state and the municipalities concerning purchase or land use controls for those properties should they be severely flood damaged in the future.

c. Construction Over or Adjacent to Streams

The Construction Over or Adjacent to Streams statute (Section 13A-94 of the Connecticut General Statutes) requires all state highway projects to minimize impacts on or from flooding. The statue mandates that all state highway construction conform to the DEP standards as set forth by the Connecticut Stream Channel Encroachment Line Program. When a new highway project is proposed the standards of Executive Order No. 18 are generally the more stringent in regard to allowable increases in flood elevation as established by the National Flood Insurance Program. However, when the reconstruction of a hydraulically inadequate highway project is proposed, the standards of Section 13A-94 are generally more stringent and mandate that flood elevations be reduced to no more than one foot above natural conditions. In those situations E.O. 18 and NFIP standards would allow in-kind replacement. Section 13A-94 is significant in that it results in reductions in backwater flooding caused by hydraulically inadequate

structures. DEP and the Connecticut Department of Transportation coordinate all highway project designs so as to assure compliance with Section 13A-94 and E.O. 16.

d. The DEP Flood Management Policy

The DEP Flood Management Policy was issued by Commissioner Stanley J. Pac on May 13, 1980, and applies only to actions conducted by the Department of Environmental Protection. It is reproduced here, in full. The policy has generally been followed by DEP's flood management program, although the policy would be more effective if it were part of a statute covering all state agencies.

"It is the policy of the Connecticut Department of Environmental Protection to protect citizens in the floodplains, and to control future floodplain encroachments through the development of comprehensive flood management planning. The expressed goal of all state regulated, managed, or reviewed projects, proposals, and planning efforts is the preservation of existing storage and conveyance areas and the overseeing of flood management proposals which are ecologically and economically sound, and which promote wise use of floodplains.

The Department of Environmental Protection seeks to guide development of flood hazard areas by providing coordination and assistance to local units of government, by coordinating federal, state, and local management activities, and through continuous monitoring and analysis of programs so as to be able to determine the success of regulatory and other actions in protecting storage and conveyance properties. These goals are accomplished through the utilization of comprehensive flood management practices which incorporate the promotion of floodplain zoning, flood related subdivision regulations, establishment and enforcement of encroachment lines; by strict implementation of Executive Order No. 18; through public or private purchase in fee, or otherwise of easements and property in critical areas; by providing special tax reductions to promote long-term non-intensive floodplain uses; through the proper location of public and private utilities so as not to encourage floodplain development; through the use of floodproofing techniques to protect new and existing structures; by improvement in the dissemination of flood forecasting and warning capabilities; through up-to-date and efficient disaster preparedness planning; by active promotion of provisions of the National Flood Insurance Program; through the encouragement of on-site detention facilities and, only lacking any other practical alternative, through the construction of dikes, dams, channel alternations, seawalls,

breakwaters, or other structural practices."

e. The Dam Safety and Inspection Program

The Dam Safety and Inspection Program is responsible for the supervision of all dams which, by breaking away or otherwise, might endanger life and property, as established by Section 25-110 through 25-119 of the Connecticut General Statutes. These statues enable the state to enter onto private property to make inspections or evaluations as necessary, require the owners of dams to perform such inspections or evaluations, order the owners of dams to make repairs as necessary to correct unsafe structures, and where an emergency exists which represents a clear and present danger to the public, repair or remove the structure and assess the owner for the costs. The statutes also require that before any dam under the state's jurisdiction is constructed, replaced, altered or repaired, the owner must apply for, and receive a permit from the state. The responsibility and liability for damages sustained through the partial or total failure of any structure rests with the owners or operators as established by the statutes. It should be noted that statewide there are approximately 3,200 dams, of which about 1100 are under State jurisdiction. Approximately 730 dams are of such size to be inventoried by the Corps and about 360 of these were actually inspected under the National Dam Safety Program. Sixty-three dams

were classified as unsafe non-emergency as a result of these inspections. CE recommendations are being actively pursued by the State; however, repair costs have prohibited many owners from taking action in a timely manner. Of the 30 dams that have been reported as failed or partially breached, four had been identified under the National Dam Safety Program as unsafe, nonemergency, primarily due to inadequate spillway capacity.

The dam safety program is staffed with a Superintendent of Dam Maintenance, a Field Inspector, and two Senior Civil Engineers, each devoting approximately 25 percent each of their time, and consulting services amounting to approximately one day per week. The primary activities conducted with this limited staff are administrative follow-up to the Corps of Engineers National Dam Inspection Program; engineering reviews of investigations submitted by private dams owners relative to the Corps of Engineers' program and DEP issued orders; field inspections verifying completed work on privately owned dams; repairs to state owned dams; and at the request of concerned local officials, residents, or property owners, inspections to determine the safety of a particular dam. With limited staff, only the most urgent tasks are undertaken, which in turn undermines the development of a comprehensive safety program.

As a result of the Corps of Engineers National Dam Inspection Program, 50 state owned dams were inspected prior to June 1982 and found to have deficiencies. Six were classified as unsafe non-emergency. Figure 14 notes those state owned dams where investigations or repairs are underway.

Following the June flood two additional engineer interns were provided to the dam safety program, but the increased work load generated by the flood means the program still only has the capability to undertake the most urgent tasks.

f. Executive Order No. 18

Executive Order No. 18 was issued by Governor Ella Grasso to comply with the provisions of the National Flood Insurance Program (NFIP). The Order requires that all state sponsored projects be subject to the minimum NFIP standards.

As mandated by the Order, the Commissioner of Environmental Protection subsequently developed guidelines for its implementation. The guidelines specify that all state agency activities must be reviewed and approved by DEP prior to initiating any action within the 100-year floodplain. An activity includes construction of buildings, structures, or roads; administration of grant or loan programs directed to construction of buildings, structures or roads; sale or

disposal of lands or other properties; and any other actions which affect land use planning within a floodplain. The Order and its guidelines provide statewide standards for

FIGURE 14

Status of State Owned Dams Needing Repair

	DAM NAME	LOCATION	STATUS OF PROJECT
*	Silver	Berlin	Construction completed
*	Lower Bolton	Bolton	Final design underway
*	Gardner Lake	Bozrah	Final design underway
	Upper Collins	Canton	Study underway
*	Pattaconk	Chester	Final design underway
*	Bashan	East Haddam	Construction completed
	Leesville	East Haddam	Construction completed
*	Groton	East Lyme	Final design underway
*	Pattaquansett	East Lyme	Final design underway
*	Pauchaug	Griswold	Study underway
	Hopeville	Griswold	Study underway
*	Higganum	Haddam	Construction completed
	Butterworth	Hamden	Study underway
*	Northfield	Litchfield	Construction completed
	Eagleville	Mansfield	Study underway
*	Dooley	Middletown	Final design underway
	Crystal	Middletown	Study underway
	Somerville	Somers	Study underway
*	Quaddick	Thompson	Study underway
*	Beach	Voluntown	Final design underway
	Beachdale	Voluntown	Study underway
*	Black Rock	Watertown	Final design underway
*	Park Pond	Winchester	Final design underway
	Winchester	Winchester	Study underway
*	Bibbins	Windham	Construction underway

* Indicates underway prior to June flood.

managing the floodplain activities of state agencies and serves to guide state sponsored activities away from unwise floodplain use as well as setting an example for municipalities to follow. Compliance by state agencies has been uneven; a problem which could be alleviated by giving the Executive Order statutory status.

g. Flood Control Projects

Flood Control Projects are conducted under the authority of the Department of Environmental Protection. The DEP may enter into agreements with federal agencies like the Army Corps of Engineers or the USDA Soil Conservation Service (described in the "Federal" section earlier) or it may conduct projects with only state and local funds. Such "state" projects may be initiated through a municipal Flood and Erosion Control Board (See municipal section). In the past the flood and erosion control statutes were not significantly utilized for the initiation of "State" projects. Since 1975, more municipalities appear to have taken a greater interest in, and have made a commitment to solving their flood and erosion problems. Figure 15 depicts the status of these projects.

FIGURE 15

Status of State Flood Control Projects

PROJECT NAME	LOCATION	STATUS OF PROJECT
Machuga Rd/Still River	Torrington	Constuction completed
North Creek Conduit	Bristol	Construction completed
Borough of Woodmont	Milford	Construction completed
Cove Pond Dam	Darien/Stamford	Inactive
Noroton River	Darien/Stamford	Inactive
Great Creek	Milford	Final design underway
Sherwood Island/Compo Cove	Westport	Final design underway
Rooster River	Bridgeport	Phase I constructed Phase II underway
Rooster River	Fairfield	Study completed August 1980 Final design not underway
Steel Brook	Seymour	Final design complete
Morningside Seawall	Milford	Construction complete
Burwells/Fairview	Milford	Study complete
West Haven Seawall	West Haven	Construction complete
Morris Cove Seawall	New Haven	Final design underway
Point-No-Point	Stratford	Final design underway
Ferry Creek	Stratford	Construction underway
Coginchaug River Rec.	Durham/Middlefield	Study money allocated
Birchwood Gardens	WestHaven/Oyster R.	Study money authorized
Fairview Avenue	Hamden	Construction completed
Farm River	East Haven	Phase I and II complete; city asking Legislature for funds for Phase III
Ox Brook	Bridgeport	Study Complete Final design underway soon
Pardee Bk/Mill River	Hamden	Construction underway
Island Brook	Bridgeport	Study completed 9/78 Negotiations underway with City re: selection of alternative
Morris Creek	New Haven	DEP study to be initiated soon

h. The Inland and Tidal Wetlands Programs

The Inland and Tidal Wetlands Programs are statutory programs to protect wetland resources and values. Decisions on regulatory applications must consider preventing damage from erosion, deterring and inhibiting the danger of flood and protecting the State's potable fresh water supplies from the dangers of drought. The scale of the proposed project and the degree of potential hazard dictate the degree to which these criteria result in approval or disapproval of an application.

As allowed by the Inlands Wetlands Act, most municipalities regulate their own wetlands through local commissions and the remaining fifteen are regulated by the Department of Environmental Protection. In the event that it is determined that a local commission is not adequately discharging its duties, the DEP may assume regulatory control over the use of the municipality's wetlands, although this has never been done.

For those communities which regulate their own inland wetlands the DEP provides engineering and ecological technical assistance to local wetlands commissions. All state sponsored activities located in or impacting on inland

wetlands are regulated by the DEP. All projects private or public in tidal wetlands are regulated by DEP.

At the present time, there are no identified deficiences in this program. The DEP has recently improved the processing of State sponsored activities by obtaining coordination with other state agencies in the earliest phases of site location and project design.

i. The State Assistance Program

The State Assistance Program began as a grant from the Federal Emergency Management Agency to support a single engineer to assist with flood insurance program requirements and has evolved to a major state and federal program involving five full time staff who provide engineering and planning guidance to the state and its municipalities. It has clearly been an effective program in developing state flood management capabilities. The program has provided a civil engineer to assist muncipalities with the implementation of the National Flood Insurance Program at the local level. DEP is now able to: (1) respond to requests for general and technical assistance from municipal officials, individuals, engineers, bankers, and insurance agents, (2) provide engineering and technical assistance to municipal officials and others on specific floodplain development proposals. (3) provide general and technical

assistance to community officials responsible for developing the required ordinance or regulations for admission into the regular phase of the NFIP, (4) attend community meetings, technical meetings, conferences and seminars dealing with the NFIP floodplain management and flood hazard mitigation, and (5) conduct community assistance and program evaluation meetings. DEP feels that a very important aspect of this program is that it has enabled the department to establish a primary state level contact for all NFIP/floodplain management inquiries. The technical assistance provided to local officials has resulted in modifications and denials of several proposals in the floodplain.

The planning efforts associated with the State Assistance Program have resulted in the development of a Flood Hazard Mitigation Manual and a flood vulnerability assessment program. The Manual, (a) provides information on the history of floods and flood hazard mitigation programs, (b) outlines methods of developing and implementing flood hazard mitigation programs at the local level, and (c) provides a recommended allocation of municipal flood hazard mitigation program responsibilities. A second planning program has developed coastal flood vulnerability assessments. These assessments document and analyze a community's history of flooding; existing flood control structures and studies; land use regulations; flood forecasting, warning and response capabilities, and the number of structures within

flood zones. At the same time, a representative sample of residents within each of the coastal communities has been queried as to their understanding of the severity of flood problems on their properties. The coastal vulnerability assessment is expected to be completed by the end of December 1983.

j. The Stream Channel Encroachment Line Program (SCELP)

This program regulates obstructions and encroachments riverward of established lines. A permit from DEP is required for any activity riverward of the approximately 275 river miles of established lines. Encroachment lines are generally based on a 100-year flood or flood of record, whichever is greater. In establishing lines, hydraulically inadequate structures are assumed replaced so as not to cause more than one foot of backwater. The initial line placement is conducted by DEP engineering staff and the proposed lines are then presented at a public hearing in the affected communities. Following the public hearing the DEP Commissioner legally establishes the lines. The lines encompass significant flood water conveyance areas, areas of high velocity flows and areas subject to significant depths of flooding.

While the program has been successful in discouraging development within the 275 river miles which have been

delineated, the high cost of establishing new lines (between $12,000 and $14,000 per mile) has reduced the ability of the State to extend the program. It should be noted that the majority of the lines were established following the devasting floods of 1955. However in 1982, an additional 12 miles were established on the highly damage prone Yantic River.

Because of the significant amount of data available from the NFIP, DEP has asked the USDA, SCS to investigate the practicality and efficiency of utilizing and supplementing NFIP data to establish encroachment lines. Although the program has been successful in reducing flood hazards, limits on program personnel have limited enforcement and monitoring. There are no full time field inspectors nor a scheduled inspection schedule.

k. The Long-Range Water Resources Planning Program

The Long Range Water Resources Planning process is the development of a long range water plan for adoption by the state. The process is overseen by an Interagency Water Resources Planning Board (IWRPB) composed of representatives from several state agencies, including DEP, Health, and the Office of Policy and Management. Flood management is one element of the plan, which is due to be completed during the spring and summer of 1983. An early effort produced by the

process was the 1980, Flood Management in Connecticut: A Program Review. While this is not officially part of the plan itself, it was prepared as part of the ongoing planning process and was designed to identify problems in the state's flood management programs. The program made 51 recommendations for state and federal action: 21 of these actions have been completed, 17 are partially completed or in progress, and 13 have not been addressed. Among the recommendations which have been acted upon are: (a) development and promulgation of a DEP policy on flood management, (b) drafting of legislation to institutionalize Executive Order, No. 18, (c) state legislation has given DEP the authority to conduct non-structural projects, (d) the Director of Water Resources has been appointed to the Connecticut River Valley Flood Control Commission, (e) a municipal flood management outreach program has been developed, (f) new encroachment lines have been delineated, in part, with the help of flood insurance data, and (g) the building code has been amended to require certain flood prevention techniques. As noted, the flood element of the Long-Range Plan is due to be completed this year. Consequently, the recommendations of this 406 report will be available for inclusion in the Long Range Plan.

J. Publications: In addition to publications already mentioned, DEP has produced many reports and manuals that are useful for flood management. Among them are

Site Plan Review: A Guide to Evaluating Natural Resource Capacity for Development (DEP March, 1982; "Flood Flow Formulas for Connecticut" (DEP, 1977); Flood Studies of Connecticut" (1977, revised and reformated, 1979, to be revised, 1983); and the Developer's Handbook (DEP, 1977). A complete list of flood information and publications is available in the 1983 Natural Resources Information Directory and List of Publications (May 1983).

C. Regional

1. Interstate Regional

There are two active interstate flood control commissions. Both the Thames River Valley Flood Control Compact (1957) and the Connecticut River Valley Flood Control Compact (1953), were enacted to provide impounding reservoirs. The creation of both compacts required an act of Congress and legislative authorization from each of the signatory states. The CRVFCC is composed of three representatives each from Connecticut, Massachusetts, New Hampshire, and Vermont, while the TRVFCC has three representatives from Connecticut and three from Massachusetts. Representatives are chosen by their respective governors, and in Connecticut, are appointed for six-year terms.

The CRVFCC requires all states to share in the cost of the office in Massachusetts, and to share in reimbursements of tax losses to the 21 communities in which the reservoirs are located. The office fees and tax reimbursements are fixed in the compact according to proportional benefits. Because Connecticut and Massachusetts benefit most from the upstream dams, we naturally pay more. Although tax reimbursement proportions are fixed, property assessments change so yearly payments change. For example, in 1953, the first year of payments, Connecticut paid out a total of $9,352.03 to Vermont, New Hampshire and Massachusetts. In 1960 the figure was $19,996.10; and by 1970 the cost was $40,197.28. Some negotiations between the Connecticut delegation and the other states have yielded lower payments in subsequent years; with the 1976 payment being $31,375.73. The Overall expense to Connecticut for the 30 years of the CRVCC's activity has been about $900,000. The costs of building the 16 dams and 16 local protection works along the Connecticut River and its tributaries have been principally borne by the federal government. These structures have reduced Connecticut's annual flood losses by an estimated $23,000,000 and undoubtedly saved countless lives.

While the CRVFCC has been primarily concerned with structural projects, there has been some discussion about amending the duties of the CRVFCC to include certain non-structural management responsibilities, a position which Connecticut supports.

The TRVFCC, unlike the CRVFCC, has not been considered as a likely agency for basin monitoring or management. The TRVFCC tax reimbursements from Connecticut to Massachusetts cost about $22,000 per year.

2. Substate Regional

a. Regional Planning agencies provide land use guidance to municipalities, and assist with drafting of ordinances or zoning regulations.

b. The Connecticut River Gateway Commission and the Connecticut River Assembly (1982) advise municipalities on land use changes along the Connecticut River, and both consider flooding as a major consideration in making their decisions. Created by state statute, the Assembly is concerned with the northern half of the River, while the Gateway Commission reviews proposals for the southern half.

D. Municipal

1. Land Use Controls

Until the inception of the National Flood Insurance Program, few communities had any form of flood zone regulations. Now, every municipality within Connecticut has some form of flood zone

protection authorized under one of several statutory umbrellas.

Section 7-148 of the General Statues gives municipalities authority to pass ordinances, and many communities have done so under this authority. Section 8-2 (et. seq.) provides authority for zoning including zoning to "secure from flood". Zoning is administered by a zoning board and its actions in most cities and towns are independent of a municipality's legislative body. Some communities may have both a flood ordinance and flood zoning.

Section 25-84 (et. seq.) provides for municipal Flood and Erosion Control Boards. These boards can regulate flood zones and cooperate with federal and state agencies in flood prevention measures.

The municipalities also have other authorities which allow them to purchase open space (7-131b), to conduct comprehensive planning (8-18, et. seq.), to regulate subdivisions (8-18, et. seq.) to regulate inland wetlands (22a-57, et seq.), to establish and maintain civil preparedness plans (28-7), and to regulate construction of buildings (29-260 et. seq.).

At this time it is believed that all municipalities have the authority to conduct any part of a comprehensive flood program.

While the State is pleased by the 100% participation of its municipalities in the NFIP, the real measure of success cannot be

measured merely by the participation in the program. The minimum regulations required for admission into the NFIP must be adequately understood and enforced at the local level. The State Assistance Program has enabled DEP to greatly expand its technical and general assistance capabilities to local officials, residents, bankers, insurance agents and engineers.

2. Flood and Erosion Control Boards

Section 25-85 through 25-89 of the Connecticut General Statutes enables municipalities to form a municipal Flood and Erosion Control Board with the power to: plan, layout, acquire, construct, reconstruct, repair, maintain, supervise and manage a flood or erosion control system; enter upon, take and hold by purchase, condemnation or otherwise property which it determines necessary for use in connection with the flood or erosion control system; defray the cost of such system by issuing bonds or other evidences of debt, or from general taxation, special assessment or any combination thereof; and assess those properties benefiting from such project according to such rules as the municipal board may adopt.

The municipal board is further empowered to negotiate, cooperate, and enter into agreement with: (1) The United States, (2) the United States and the State of Connecticut or (3) the State of Connecticut in order to satisfy the conditions imposed by the United States or the State of Connecticut in authorizing any

system for the improvement of navigation of any harbor or river and for protection of property against damage by floods or by erosion, provided such system shall have been approved by the Commissioner of Environmental Protection.

These statutes enable a muncipality which has recognized a particular flood or erosion hazard potential and is dedicated to reducing or eliminating the hazard, to work with, and receive assistance from federal and state agencies. The municipality must make a financial commitment based on federal cost sharing requirements for a federal project or for a state/local project based on the ownership of the benefitted property. The state will provide two-thirds of the project cost if the property protected is municipally owned. When the project benefits private property, the state will provide one-third and the muncipality will provide two-thirds of the project costs.

E. Private

The private sector is presently involved with flood management only in disaster response. Agencies such as the Red Cross or the Mennonite Disaster Service coordinate with the Office of Civil Preparedness, and their actions and responsiblities are delineated in the state's Emergency Operations Plan.

F. Other Hazards Mitigation Measures

Some of the protective and preventative measures used to reduce the impact from flooding are useful in the mitigation of other hazards.

1. One measure is the preparation of emergency warning, evacuation and disaster recovery plans that would lessen the severity of the disaster. Consequently we are recommending that special flood preparedness plans be developed for the coastal towns.

2. The second measure is the mitigation of structural damage through the adoption of policies that would require strengthening of existing structures to withstand the hazards effects. The 1978 Connecticut Basic Building Code policy addresses two natural hazards, snowstorm and wind, in this way. In addressing the snowstorm hazard the Basic Building Code specifies a basic snow load of forty pounds per square foot of horizontal projection, subject to modification for geographic location and/or structurtal configuration, which is to be used in the design of structures. Similarly, the Code specifies wind loads to be used in the design of structures. These loads are based on the 50 year recurrence interval wind speeds, which in Connecticut range from 70 to 85 miles per hour. The corresponding wind pressures, which act normal to a structure's surface, range from 13 to 66 pounds per square foot depending upon both the wind speed and

geographic location of the structure. These basic wind speeds apply to all storms except tornadoes.

3. Special building design requirements for structures that will be located within the coastal high hazard area, are also specified in the Connecticut Building Code. These include: (a) the use of a minimum wind speed of 100 miles per hour for determining wind loads on structures, (b) designing structures to withstand velocity waters and hurricane wavewash from waves at least 3 feet high, (c) the use of piles or columns in lieu of fill for structural support and finally (d) situating structures such that the lowest portion of the superstructure, exclusive of piles or columns, is located abcve the 100-year flood elevation plus maximum wave height.

4. The interchange of water supply and flooding is twofold. The possibility of modifying existing or proposed water supply reservoirs for increased flood detention has been raised. Likewise, the uses of flood control detention facilities for water supply has also been raised. Because most water supply utilities have facilities which are built and are being used close to the margin of their safe yield, the possibility of providing flood water storage capacity in public water supply reservoirs is not very great unless the reservoir is modified. However, the opposite, provision of water from flood control reservoirs to meet water supply needs, especially during "Water supply dorughts" may be feasibile because of the low flow

conditions which would be occurring at the time of need. Impounding of any stream flow above that needed to maintain minimum stream flow requirements would be desirable if provisions could be made to transfer the water to the needed areas. The Army Corps of Engineers is presently studying 3 of its structures at Thomaston Dam, Black Rock Dam at Thompson, and Mansfield Hollow Dam of Mansfield (The Mansfield Hollow report is available in draft form) to determine the feasibility of using flood control reservoirs for water supply.

5. Coastal Shore Erosion Problems have been identified by the DEP in the document Shoreline Erosion Analysis and Recommended Planning Process (1979). This document presents a current picture of the geology, geomorphology and important coastal processes which influence shoreline erosion. Presentation of these features and processes is necessarily brief with emphasis placed on the factors which are most important in producing shoreline change. Secondly, after discussion of the geophysical base, an attempt has been made to quantify the impacts of erosion through a general identification of those portions of our shoreline which are potentially erodible and those areas which are influenced by significant erosion. Subsequent to this general characterization, management alternatives are presented with the objective of enumerating a recommended planning process aimed at mitigating the types of erosion impacts which are experienced along Connecticut's shore. When viewed in context these elements form the foundation of a long range, resource-based planning

process which is needed to adequately evaluate and mitigate shoreline erosion and its impacts.

V. POST FLOOD: REPORTS, ANALYSIS, ACTIONS, AND RECOMMENDATIONS

(Relationship between existing measures and Damages)

A. Hazard Mitigation Team

Implementation of the recommendations of the Interagency Flood Hazard Mitigation 15-day and 90-day reports is progressing well. At this time some action is being taken on essentially every recommendation with many detailed studies underway by both federal and state agencies. Pending outcome of the federal investigations, the state will take appropriate action to insure implementation of a federal project or encourage the municipalities to initiate a state/local project.

1. Municipal

a. Town of Cheshire Sewage Treatment Plant

The June flood caused extensive damage to this treatment plant. The basement and one foot of the first floor were flooded causing damage to the control panel circuit breakers, 12 large vacuum filters, sludge pumps, air blowers and other electrical components. Consequently, the plant was closed for four days resulting in untreated sewage being discharged into the Quinnipiac River at an average rate of 700,000 gallons per day. Direct damages to the plant are extimated at $480,000.

The flooding of this treatment plant has been well documented since its 1971 construction. Prior to the June

flood several investigations were underway to reduce the reoccuring flood damages. Following the June flood, the USDA Soil Conservation Service investigated the construction of an earth dike, steel sheeting flood wall, earthen dike with a steel sheeting core, and flood proofing of individual plant units. The selected plan was an earthen dike 1,770 feet long with an average height of 8 feet with 2.5 to 1 side slope, a 700-foot long vegetated diversion channel, one CSF pump for handling interior flood waters and a pumping station to pump treated effluent over the dike during flood periods. The total cost for this measure is estimated to be $321,200. This is a draft plan subject to review by federal and state agencies. No significant problems are anticipated. The project will be sponsored by the Town of Cheshire and New Haven Soil and Water Conservation District, providing flood protection for the facility from up to and including the 0.2 percent chance flood.

b. Towns of Essex and Westbrook

Although the Town of Essex did not implement a temporary building moratorium as recommended by the hazard mitigation team, the rebuilding process has progressed slowly and FEMA and the State have provided technical assistance to the community in order to insure that all rebuilding is done to proper standards. At the present time three dam owners are

planning to replace their structures which will be constructed to current safety standards. All state road crossings will be reconstructed to the 100-year standards. It does not appear that FEMA's section 1362 acquisition program will be applicable to any areas in the community. (There are 3 parcels in Mansfield that appear to fit 1362 property purchase requirements, and the town has expressed interest in pursuing the 1362 program.)

At the request of the Town of Westbrook, the Corps of Engineers performed a reconnaissance investigation of the Falls River in Westbrook and Essex. It was determined that there is not a major recurring flood problem in these areas. Damages relating to the June 1982 flood were primarily caused by the succession of dam failures rather than the river flow normally associated with a storm of that intensity. As a result of this investigation it was determined that the area did not warrant Corps participation in a flood control study. It was recommended that the towns strictly enforce their floodplain management standards. Both FEMA and DEP will continue to provide assistance to insure this is accomplished.

The Flood Insurance Studies for the Towns of Westbrook and Essex are presently being revised to reflect the changes in the Falls River caused by the June flood, dam failures, and

the extensive stream stabilization work performed by the USDA, SCS.

c. Town of Franklin

A short reach of the Yantic River flows through this primarily rural town and causes repetitive and sometimes significant flood damage to four residential structures. The flooding is aggravated by an abandoned bridge over the river and a dike which was built to protect a sanitary sewer siphon. The homes all have basements and first floors which were inundated. The home nearest the river suffered severe erosion and undermining along the foundation. The other homes also suffered erosion along the foundations but no significant structural damage. The dike protecting the sewer siphon was overtopped and eroded in many areas. The bridge remained intact but is structurally unsound.

The DEP, in cooperation with the USDA, SCS, has investigated the Yantic River watershed and developed a work plan for watershed protection, flood prevention and recreational development. The plan, if implemented, would significantly reduce the future flood damage potential in the Towns of Norwich and Franklin. However, to date, the plan has not been accepted by the upper watershed communities where the major works of improvement would take place.

The watershed protection plan consists of the installation of land treatment measures, the construction of two floodwater retarding structures, one multiple purpose structure for flood prevention and recreation and 7,000 feet of channel improvement. The structures and channel work would provide protection from a 100-year frequency storm.

Due to the lack of local support for the proposed project the DEP in cooperation with the USDA, SCS, began a non-structural investigation of the watershed in 1982. An acceptable cost-benefit ratio could not be found for the alternatives investigated. A more detailed sutdy which will combine structural and non-structural elements will be started in FY 1984.

If a cost-justifiable solution cannot be found, or if the solution is not acceptable to the communities involved, the towns of Norwich and Franklin acting through their Flood Erosion Control Boards, should solicit DEP assistance in solving the flood problems.

The DEP has recently established Stream Channel Encroachment Lines on the Yantic River in the Towns of Norwich, Franklin, Lebanon and Bozrah to insure that future development does not increase flood hazards. In the event of major destruction along the Yantic, new construction or major reconstruction will be done to encroachment line standards.

The Town of Franklin has applied to FEMA for funds to remove the abandoned bridge crossing the Yantic River. FEMA has approved this request as of July 1983.

d. City of Hamden

The Meadowbrook Co-Op (320 units built in 1957) is located within the 100-year floodplain land and is directly influenced by the Mill River, Pardee Brook and Shepard Brook. Basement flooding has been a recurring problem (3-4 times per year) and the June flood, considered the flood of record for this area, caused severe flooding. Prior to the June flood, the City of Hamden and DEP were aware of the potential flood hazard and negotiated for the implementation of a state/local flood control project. The degree of protection to be provided to the area was a controversial issue between the state and town. After several meetings, it was decided that a project would be undertaken to provide 100-year protection from Mill River flooding and 50-year protection from Pardee Brook flooding. This action further demonstrates the need for a comprehensive updating of the state flood management policies to set statewide standards. (See section on the State Executive Order No. 18)

e. City of Milford

The two major flood damage causing rivers within the City are being evaluated to determine alternative methods of

flood control. The Wepawaug River is being investigated by the Corps of Engineers under their Section 205 authority. Based on a preliminary hydrologic study and economic damage surveys it appears that the Corps may be able to become involved in a channel improvement project in the lower reaches of the river. The Indian River will be evaluated for possible flood control measures by the USDA, SCS, under the Central Coastal River Basin Study.

The City of Milford has taken steps to relocate the offices and City records out of the basement of the City Hall which was inundated during the June flood. Existing city plans call for the flood related repairs to be made to the basement which will then be utilized in a manner to reduce the damage from future floods.

f. City of New Haven

1. West River

During the June flood the heavily industrialized Westville section of New Haven suffered significant damage. Many industrial and commercial properties formerly untouched by flood waters were inundated. Damage to city property included the washout of roadways, sidewalks, and recreational facilities.

The potential flood hazard in this area was recognized by the city prior to the June event. In the past, the City initiated engineering studies of particular reaches of the West River and recently had a consulting firm undertake a comprehensive study of the entire length of the West River. Following the flood this study was reviewed and updated. The recommended actions of this study consist primarily of extensive channel and bridge improvements.

Presently, both the Army Corps of Engineers and the DEP are pursuing investigations to assist the City with the implementation of a flood control project. The CE is proceeding under its Section 205 program. Preliminary indications are that a feasible U.S. Army Corps of Engineers project could exist. The total estimated cost of the improvements recommended by the consulting firm is $1,600,000.

2. Morris Creek Area

The floodplain of Morris Creek is densely populated with residential structures and the Tweed-New Haven Airport. Flood damages are attributed to the low-lying elevations, poor drainage systems and poor channel conditions. This area has been subject to periodic flooding and, as with West River, the City has undertaken several studies to

investigate possible methods to reduce the flood damage potential.

In 1975 the City requested assistance from the CE. At that time the CE determined there was insufficient economic justification for federal participation. Following the June event CE assistance was again requested by the City. Recent policy changes for CE studies dictate that flood control studies under Sec. 205 authority could not be performed on streams where the 10 year frequency discharge was less than 800 cubic feet per second. As the 10 year discharge on Morris Creek is substantially below this limit the City was informed that the CE could not participate.

Past studies performed by the City have been submitted to DEP in hopes of initiating a state/local project. However, DEP has not accepted them as adequate justification for state participation. At one time funds were appropriated by the legislature for the DEP to initiate its own study. At that time other areas represented a higher flood hazard potential and the Morris Creek Area was not studied. In light of the June flood DEP expects to begin a comprehensive study of Morris Creek in the near future.

g. <u>City of Norwich</u>

The Yantic River in Norwich is the major cause of flood

damage due to residential, industrial and commercial development in the floodplain. The floodplain is within an integral economic segment of the region.

Residential, industrial and commercial properties, railroads, roads and other service facilities are all subject to flood damages in varying degrees. In 1981 the annual flood damages were estimated to be $246,900.

As a result of the repetitive flooding which has occurred the City of Norwich in cooperation with the National Weather Service, Northeast River Forecast Center has initiated a flood warning/preparedness/evacuation plan which has worked very well for those areas where measures can be taken to protect damageable property. Although the system has worked well, damages have, and will continue, to occur. DEP has recommended that Norwich be included in a pilot test program for implementation of an automated flood warning system.

In an effort to solve the flooding problem the City of Norwich continues to be supportive of the proposed USDA, SCS, PL-566 project. However without the support of the upper watershed communities no progress can be made. As discussed (see the Town of Franklin section), the SCS has re-investigated the Yantic River watershed during April 1983, to determine if a combination structural/ non-structural solution could be found which is acceptable

to all communities. It was determined in the preliminary study that a primarily non-structural project could be implemented. A more detailed study will be completed in FY 1984.

The City of Norwich, in cooperation with the Corps of Engineers, held a floodproofing workshop in April 1982 for those businesses which are subject to repetitive flood damage. The workshop presented practical flood proofing measures which could be implemented by the property owners to provide protection from the more frequent flood events.

h. Town of Wallingford

1. Gopian Trailer Park

This trailer park lying within the 100-year floodplain and partially within the designated floodway of the Quinnipiac River has a history of chronic flooding. Neither the state under its encroachment line program nor the town have been able to adequately control expansion of this park

a. Investigate solutions. Following the June flood, the Town of Wallingford requested the Corps of Engineers to investigate possible solutions to the flooding problems at the trailer park. The CE is

presently investigating an array of possible structural and non-structural approaches available to remedy the problems. The CE efforts appear to be providing the most practical approach to this problem.

b. Coordinate with the City of Meriden to receive flow data from upstream. The intent of this recommendation made by the HMT was to enable the town to develop an early warning/evacuation plan for the trailer park.

c. Strict enforcement of local zoning codes as outlined by the NFIP. Neither FEMA nor the State DEP have received any indication from the town that measures have been taken to improve its floodplain management activities. The State DEP in cooperation with FEMA will schedule an intensive technical program to assist the town in improving its program. This will be scheduled following a CE determination on the feasibility of a flood control project for the trailer park. This area presents the primary floodplain problem to the town.

2. Roads, Bridges and Culverts

The Hazard Mitigation Team recommended that the hydraulic design of replacement stream crossings destroyed by the flood should be done in accordance with current standards while also providing adequate protection from debris and scour-related failure. Those stream crossings on the Federal Aid Highway System are being replaced to the 100-year flood standard through the Federal Highway Administration's Emergency Relief Program. It is the policy for the Connecticut Department of Transportation to design to the 100-year flood standard as mandated by Executive Order 19 and by state statue.

For those local stream crossing not located on the Federal Aid System, the replacements are being funded by FEMA public assistance program. This program calls for all publicly owned structures to be replaced to the preflood condition with a maximum of 15 percent of the Damage Survey Report total available for disaster proofing. If more stringent standards are formally adopted, enforced and in general use by the applicant at the time of the disaster, the structure would be upgraded.

The State supports the policy of whenever possible, upgrading hydraulically inadequate stream crossing to provide adequate capability to pass the 100-year flood discharge. However, as the flood recovery progressed it became evident that most municipalities had inadequate stream crossing standards to qualify for upgrading under FEMA's public assistance program. Presently, some stream crossing funding decisions are being appealed to FEMA. (There were three formal appeals in Old Lyme, one in East Lyme; three in Naugatuck involving FEMA bridges).

In an effort to eliminate this problem in future disasters as well as encourage wise construction on a routine basis the DEP and DOT will coordinate a statewide municipal outreach program to explain the problems and conflicts encountered during this disaster and encourage municipal standards equivalent to those in effect at the State level. The initial contact will be completed by September 1, 1983. DEP and DOT will be available to provide assistance to municipal officials.

B. Dam Safety Actions

1. Special Session Actions

The serious flooding which occurred in June was aggravated and

sometimes caused by failure or partial breaching of existing dams. Prior to the June flood, detailed investigations and repairs had been completed on two state-owned bridges, and 14 detailed investigations were underway. The emergency session of the Legislature, which convened following the June flood, appropriated $4.5 million for the repair to state owned dams. These funds have been utilized to initiate detailed investigations on 9 state owned dams. Figure 14 depicts those state-owned dams where investigations or repairs are underway.

The emergency session also recognized the potential hazards associated with dam safety and mandated that a comprehensive study of the State's dam safety program be undertaken. The study was to include: (a) An estimate of the number of public and private dams requiring repair, modification or removal; (b) a review of the function, environmental impact and public benefit of private dams in need of repair which pose a significant threat to public safety or which provide substantial public benefits; (c) a review of the adequacy of existing authorities, procedures, staffing and funding pertaining to dam safety, and; (d) recommendations for improved dam safety regulation and alternative mechanisms for funding repair or removal of public and private dams. The consulting firm which was hired also provided DEP with an updated computerized data base of dam information.

In order to complete the task described previously the firm began by contacting and canvassing various federal state and local agencies for available existing dam information. Additionally, the chief elected official of each municipality and each utility company owning dams were sent questionnaires requesting available pertinent information. All pertinent dam information was then recorded on a computerized dam inventory form. In order to identify the magnitude of the work required to bring Connecticut dams up to acceptable safety standards a detailed review and evaluation of the data was undertaken. Existing authorities and procedures were reviewed and compared with those of the Army Corps of Engineers, the State of New Hampshire and the National Dam Inspection Program.

2. Private Dams

In order to assess the value, threat and significance of private dams a review was undertaken to determine their function environmental significance, and public and private benefit. Those private dams posing a significant threat to public safety and providing a substantial public benefit were ranked according to their value. An evaluation of current dam safety legislation was also done. The report noted many deficiencies in the current dam safety program:

- Present staffing and funding levels were inadequate.

- There is no current budgeted funding for repair of state owned dams and there is no program for repair of privately owned dams.

- Penalties for failure to comply with repair orders have never been implemented.

- There is no program for regulary scheduled dam inspections.

- There are no published criteria for the determination of spillway adequacy and determination of structural integrity.

- The supervisory power of the Department of Administrative Services (DAS) over dam repair in excess of $100,000 can be redundant and cause delay.

- Inventory information needs updating.

- There is no current requirement for registration of existing dams.

- Spillway criteria have not been established by regulations.

- A nonlapsing Dam Maintenance Fund has not been established by the state.

- There are no provisions for generating revenue from the operation of existing dams.

- Provisions in state statutes for establishment of taxing districts to finance maintenance and repair of dams are inadequate.

- There is need for more and faster legal action against dam orders who fail to comply with repair orders.

- The Water Resources Unit has not established an adequate enforcement process.

3. Legislative Deficiencies

In order to strengthen and improve existing legislation the following deficiencies need to be addressed:

- The present Connecticut General Statute Chapter 479, Sections 25-110 to 25-119 "Dams and Reservoirs" is a comprehensive Statute but requires additonal legislation to improve and strengthen the powers of the supervising unit.

- Legislation is broad brushed; it should contain more specifics and be expanded, especially in the area of registration and certification of approval of all existing and new dams.

- No definitions are given.

- The commissioner of DEP lacks the administrative authority for the repair of state-owned dams when costs are in excess of $100,000.

- The existing statute requiring regulations is vague.

- The burden of inspection is on DEP instead of on dam owners.

- There is no statute requiring the owner to pay the cost of inspection.

- Present legislation does not allow user fees to be levied on private owners for repairs.

- There are no provisions for instituting fees to offset program costs, except for the present $10 application fee.

- No authority is granted to obtain unused or abandoned dams.

4. Cost of Improvements

It was estimated that the costs for implementing and maintaining a comprehensive dam safety program would be:

- $750,000: increase staffing and re-organizing the DEP Water Resources Unit.

- $66,000,000: to complete Army Corps of Engineers Phase II-type inspections and final design documents for dams in need of repair.

- $101,000,000: to repair and maintain all dams in the state.

5. Program Recommendations

In order to develop a comprehensive dam safety program the following major recommendations were made:

1. Implementation of detailed legislation which would enable the DEP to take immediate action in an emergency situation, require all dam owners to register with DEP, initiate a periodic inspection schedule, grant DEP sole authority over the repairs to state owned dams, and require the establishment of regulations.

2. Completely update the existing dam inventory which would include the establishment of a routine inspection program and the development of a fee system for such inspections to help offset program costs.

3. Increase the Dam Safety Program Staff by providing additional experienced technical staff capable of performing Army Corps of Engineers Phase I type inspections on all dams in Connecticut.

4. Initiate a program to improve and/or develop more site specific dam safety design guidelines. Special attention should be given to hydraulic capacity and spillway design, as well as risk assessment methods.

5. Development of alternative funding mechanisms to enable private dam owners to undertake the necessary repairs to place a dam in a safe condition.

Following the submission of the final Report DEP devoted a great deal of time to reviewing its contents and developing what it felt was a realistically obtainable comprehensive dam safety program with major elements being phased-in over a two year time period. As a result of the dam safety study a report was submitted to the Legislature by DEP. It should be noted that this report has generated public and media interest and appears to have legislative support.

C. Statewide Survey of Flood Problems

1. Municipal Input

Following the June event DEP began to receive a significant number of requests from community officials for the initiation of flood control studies and/or projects in areas where there hac been no previously identified flood hazards. As a result of these new requests DEP began to reexamine and redevelop its flood prone area priorities. In order to assist in this task and with the June flood still fresh, DEP contacted each chief elected official explaining the state-wide flood area reevaluation and asked for their input regarding the communities' problem areas. To date, responses have been received from 45 communities. The information received varies in scope and detail. However, it does provide insight into the degree of hazard as well as both the communities' perception of the problems and its dedication to resolving them.

2. Flood Vulnerability and Establishment of Priorities

There are two planning projects aimed at assessing the state's susceptibility to flood hazard. The first is a Coastal Flood Vulnerability Assessment. The greatest potential for flood damage exists on the shoreline and it is apparent that neither the coastal communities nor their residents are fully prepared for the consequences of a major coastal flood: A recent DEP inventory of 25 coastal municipalities delineated 35,000 buildings in flood zones, less than half of which were covered by flood insurance. That deficiency is compounded by the lack of adequate emergency preparedness plans.

DEP will address these needs through consultation with municipal officials. A municipal profile will be prepared documenting a community's flood susceptibility, its flood management programs and its general level of flood preparedness. The profile describes such elements as floodplain zoning regulations, flood insurance coverage and claims, property owner's awareness of flood hazards, and a review of municipal programs dealing with mitigative measures.

The second project being prepared by DEP is a Flood Preparedness and Vulnerability Assessment by Drainage Basin. While the potential for flood damage is greatest on the coast, no area of the state is immune to flooding, as was shown by the June 4-7, 1982 flood, and by the many flood studies by the Army Corps of Engineers, USDA, SCS, and the state (see section on Existing Programs). It is felt that studying and classifying flood hazards by drainage basins is a better management approach than doing so based on municipal boundaries. The state already has delineated all drainage basins down to one square mile size, so the base mapping already exists for the State's 8 major, 45 regional; and 334 subregional basins. The wave of requests for flood relief projects after the June flood emphasized the need for (a) a consistent, statewide system to identify and rank flood hazards based on drainage basins rather than political boundaries, (b) a state strategy for flood hazard mitigation efforts based on such a classification. The classification system will be developed in cooperation with the Coastal Area

Management Unit, Water Resources Unit, and Natural Resources Center of the D.E.P.; the Office of Civil Preparedness; selected municipalities; the U.S. Army Corps of Engineers and the USDA Soil Conservation Service. The initial task will be the establishment of a comprehensive inventory of potential flood damages based on existing reports or correspondence. A recommended course of action for flood mitigation efforts to be followed by federal, state and local interests will be provided to municipal chief executive officers and pertinent state and federal agencies.

D. Municipal Workshops

1. Flood Management Workshop

On October 27, 1982, the Office of Civil Preparedness and the Department of Environmental Protection conducted a workshop to promote the development of improved municipal flood management programs. The workshop, initially targeted for 100 people, actually had close to 300 municipal officials present. The program discussed Federal and state assistance, explained the drainage basin concept, and had workshops on operating and maintaining flood structures (for which a special publication was prepared: Protecting Your Investment: Operating and Maintaining Municipal Flood Control Projects), developing a stormwater management plan, preparing self-help early warning systems, conducting emergency damage reporting, avoiding coastal flooding

and erosion impacts, and floodproofing techniques.

2. Commercial and Industrial Property Owners Workshop

This workshop was held in June 1983, by the Department of Environmental Protection, the Department of Economic Development, and the Army Corps of Engineers, who was the sponsoring agency. The purpose was to assist property owners by improving their awareness of flood preparedness and floodproofing methods. A key component of the workshop was the development of a "flood audit" process, which will enable the participant to return to the property and be able to assess the flood damage potential at a particular site and identify methods to reduce particular hazards. The DEP and CE will be available to provide general and technical assistance in evaluating and implementing specific floodproofing alternatives.

3. Flood Preparedness Workshop

DEP and the Office of Civil Preparedness will consider conducting a workshop for local civil preparedness directors to evaluate local flood emergency plans. The workshop could utilize the floodplain information developed by the National Flood Insurance Program as well as the emergency operating plans developed for potentially hazardous dams. The format recommended by the National Weather Service would be used as a model. The major purpose of the workshop would be to inform municipal civil

preparedness directors of the flood hazard information available, how to utilize the information and how it should be incorporated into local flood emergency plans.

4. Dam Safety Conference:

On September 26 and 27, 1983 the DEP will conduct a conference for dam owners which will address operation and maintenance, engineering and repair considerations, and emergency operation planning.

E. Civil Preparedness

The Office of Civil Preparedness issued advisory Bulletin #11-4 on December 30, 1982 to encourage local development of detailed flood emergency plans. This advisory outlined a "typical flood emergency plan". The OCP has also requested $30,000 from the state legislature to begin an annual sandbag replenishment program.

F. Federal Follow-Up

The Army Corps of Engineers (CE) and the USDA Soil Conservation Service (SCS) quickly responded to post disaster needs by undertaking preliminary investigations in flood prone areas.

1. The CE have initiated the following Section 205 reconnaissance studies in areas suffering significant flood damage. The DEP

will take approriate action to insure the implementation of a federal project or take steps to provide state assistance where a CE project is not justified.

a. Wepawaug River, Orange/Milford

The Wepawaug River has a total drainage area of 19.8 square miles of which 15 square miles lie above Milford. In Orange, the 100-year floodplain is predominantly residential property, while in Milford the properties are more commercial in nature. The June storm caused heavy flood damages from Orange, downstream to Long Island Sound. These losses included two deaths, heavy damage to public streets and to bridges, residential and commercial property. Based on very preliminary hydrologic studies and economic damage surveys, it appears that the Corps may be able to become involved in a channel improvement project in the lower reaches of the river in Milford. The tentative plan would include lowering or removing dams, increasing bridge and channel capacities, and construction of non-structural measures, for a total cost of about $2 million. A reconnaissance report will be prepared by the summer. Additional studies would have to be accomplished to determine whether any improvements could be undertaken in Orange, where damages are primarily residential.

b. Mad River/Waterbury

Recurring flood problems have caused damages to property along the Mad River. The total drainage area is 26.4 square miles with a fall of 450 feet in its 6.5 mile length. The lower watershed is heavily urbanized. During 1979 the CE studied three alternatives to prevent flood damages at the Fleisher Finishing Corporation plant; and based on a comparison of annual costs for the alternatives and the annual benefits, there was not sufficient economic justification for CE participation. Due to extensive flooding which occured during June 1982 the area will be reevaluated to determine if conditions have deteriorated sufficiently to establish economic justification for a CE project.

c. Means Brook, Burying Ground Brook/Shelton

Along Means Brook there are two areas of flooding. The residential area contains eight homes within the 100-year floodplain, and most of the damages from the June storm were from basement flooding. The commercial area in the Huntington section of Shelton contains approximately 40 businesses within the 100-year floodplain with the potential for more than 3 feet of flooding in some structures at the 100-year flood. Six stores and the post office were damaged in the June flood.

Burying Ground Brook flows through the center of the city. During the June storm the lower floors of two factories were damaged and water overflowed the upstream banks and flowed down Center Street. Minor washouts occurred at three areas where the water reentered the brook. A reconnaissance study is underway for the Shelton areas to determine if CE participation is warranted. However, federal authority to provide protection for the small number of residences along Means Brook is limited.

d. Several Watersheds/Danbury

The potential flooding problems in Danbury are widespread along Limekiln Brook, Sympang Brook, Padanoram Brook and the Still River. Preliminary investigations indicate that over 75 commercial or industrial structures and 30 homes are located within the 100-year floodplain.

There are presently two local protection projects along the Still River in Danbury. A major portion of the river was channeled by a Corps of Engineers Project and the city's Central Flood Urban Renewal Project. Potential damage areas are identified upstream and downstream of the local protection projects and on the major tributaries. The identification and location of the potential damage areas are noted in the Housatonic Urban Study. In response to a request from the city, a CE reconnaissance study is underway.

e. Beaver Brook/Ansonia

The lower 3,000 feet of Beaver Brook is protected from flooding as it is an integral part of the Ansonia-Derby local protection project. However, the 3,000-foot length between Quillinan Reservoir and Cook's Pond frequently floods, damaging residential properties along Myrtle Street. In 1980, the CE determined that a federal flood control project could not be constructed because the estimated 10-year discharge was less than the 800 cubic feet per second minimum flow rate for CE participation. As a result of the June flood, however, a reconnaissance hydrologic study was performed to determine if changed conditions could warrant CE participation. In December of 1982, the CE informed the City that the 10-year discharge still did not meet the minimum requirements for CE participation.

Immediately following the June flood the USDA, Soil Conservation Service restored the Beaver Brook Channel to its pre-flood condition, but that was not intended to be a flood control project. The area has been referred to the USDA Resources Conservation and Development Program for investigation.

f. West River/New Haven and Woodbridge

The West River has its origin in Bethany and flows southerly about 12.5 miles to tidewater at New Haven Harbor. It has a total drainage area of 36 square miles. The major flooding problem is located about 3.5 miles above the river's mouth, in an industrial area. A preliminary investigation is underway to determine if there is sufficient economic justification for CE and SCS participation along the West River.

g. Quinnipiac River/Wallingford

A trailer park lies entirely within the 100-year floodplain/floodway of the Quinnipiac River. The park contains about 90 trailer units which have suffered repeated flood damages. In 1973 at the request of the town, the CE investigated alternative methods to prevent future flooding of the area and developed a structural plan consisting of the construction of a levee with an interior pumping system. It was found not to be economically justified. Following the flood, which again caused heavy damage to the trailer park, the town again requested assistance. A reconnaissance investigation is presently underway which will concentrate on non-structural alternatives such as relocation, which is less costly and more likely to be economically justified. (See section on follow-up to the Hazard Mitigation Team report).

h. Miller's Pond/Waterford

During the June storm Miller's Pond Dam experienced damage, and a portion of the dam was overtopped. Several properties and four highway bridges located downstream of the dam were also damaged. Although the CE has no authority to assist in the repair of privately owned dams, under the Section 205 authority they may participate in modifying privately-owned dams for the purpose of flood control, providing the work is economically justified. The CE investigation concentrated on ways of modifying Miller's Pond Dam to provide additional flood protection to downstream properties. It was determined that the CE could not participate in the construction of flood control improvements at Miller's Pond Dam due to the limited amount of available flood storage capacity that exists behind the dam and the lack of economic justification for providing additional storage.

It has also been recommended that Waterford should consider less costly alternatives if additional flood protection is desired along Hunt's Brook. Such measures should include increasing the channel capacity of Hunt's Brook, floodproofing or relocating flood prone property, flood insurance, and installing a flood forecasting and warning system. DEP will coordinate with the Town to determine if such alternatives can be implemented.

i. West River/Guilford

The West River in Guilford caused flooding and erosion damage to a private recreation area known as Fisherman's Nook. The CE determined there were no federal programs which could provide assistance to protect a limited number of residential properties from flooding or to protect private properties from erosion. The CE did note that by removing accumulated sand and gravel deposits, as well as accumulated snags (trees, branches, etc.) in the area immediately downstream of the property, the flood profile could be reduced somewhat. This action would not prevent inundation by a storm as severe as June 1982, but it might prevent less severe storms from overtopping area river banks. In order to provide adequate protection from severe storms the construction of a earth filled dike would be necessary. DEP will coordinate with the town of Guilford in an attempt to reduce the future flood damage potential. In this area, however, it is unlikely that state participation is warranted as any works of improvement would primarily benefit only one property owner.

j. Morris Creek/New Haven

In 1975 the CE performed reconnaissance studies in order to provide flood control improvements along Morris Creek in the vicinity of Tweed-New Haven Airport. It was then determined

that insufficient economic justifidation existed for federal participation. Following the June 1982 storm, New Haven again requested CE assistance. It was determined that no assistance could be provided, as the CE considers this a local drainage problem.

The DEP has initiated a study of the area to determine if state participation in a flood control project is warranted.

k. Nonewaug River/Woodbury

Under Section 14 of the 1946 Flood Control Act, the CE investigated the feasibility of providing emergency streambank protection along Middle Road Turnpike in Woodbury. The roadway is endangered by continuing erosion. It has been determined that federal assistance in the protection of the roadway is economically feasible and the Army Corps of Engineers is prepared to recommend construction of a bank stablization project pending the town of Woodbury's submission of a letter of intent indicating its support of the project.

l. Falls River/Westbrook, Essex

At the request of the Town of Westbrook, the Corps performed a reconnaissance investigation of flooding conditions along the Falls River in Westbrook and Essex. The Falls River

flows in an easterly direction through the town of Westbrook for a distance of approximately 3 miles, entering the Town of Essex near Dennison Road. In Westbrook the river passes over Messerschmidt Pond Dam and continues downstream over Wright's Pond. During the June 1982 flood a partial breach was formed in the earth dike located on the right bank of Messerschmidt Pond Dam. It was reported that this breach caused some damage to West Pond Meadow Road, located just downstream of the dam, but only minor damages to industrial and residential properties within the Town of Westbrook.

In the Town of Essex, the Falls River flows in an easterly direction for a distance of 5.3 miles. The Bushy Hill Pond Dam, located on an unnamed tributary of the Falls River in the town of Deep River, failed during the June 1982 flood and sent a wave of water downstream. This flood wave caused a series of four additional dam failures along the Falls River. In addition to the dams, major damages were sustained at the Pratt-Read Corporation and residences along Comstock Avenue in the Ivoryton section of Essex. Other substantial damages occurred immediately downstream of Mill Pond Dam, in the Centerbrook area of Essex.

The CE investigation determined there is not a recurring flood problem in these areas. Damages related to the June 1982 flood were primarily caused by the succession of dam

failures and the resulting floodwave, rather than the river flow normally associated with a storm of that intensity. Consequently the CE determined they could not provide Section 205 assistance. The CE recommended that both towns strictly enforce their floodplain management standards. Both FEMA and DEP are continuing to provide both general and technical assistance to the communities.

m. Inspection of Dams

Immediately following the June event, the CE was requested by the Governor to inspect dams classified as unsafe, non-emergency under the National Dam Safety Program. A total of 70 dams were inspected and DEP has pursued implementation of the recommendations of those inspections.

2. On Sunday, June 6, 1982, the SCS began to evaluate the potential problems resulting from the significant rainfall and by Monday had the approval of the SCS national office to implement the Emergency Watershed Program provided by Section 216 of Public Law 81-516. The objective of this program is to assist in relieving imminent hazards to life and property from floods and the products of erosion created by natural disasters. There are two situations, exigency and nonexigency which are evaluated under this program. An exigency exists when the immediate threat of damage to life or property is enough to warrant immediate Federal actions. It is 100 percent federally funded. Nonexigency

situations exist when the near-term probability of damage to life or property is high enough to constitute an emergency, but not sufficiently high to be considered an immediate threat. Funding for a nonexigency situation is 80 percent federal and 20 percent state or local. During the June event the State agreed to pay all local shares of federal disaster assistance. However, for the emergency watershed protection program the local government has been asked to provide operation and maintenance of the completed work. Figure 16 is a brief summary and status of the work under this program.

Activities under the USDA Resource Conservation and Development Program has included the development of a flood prevention measure for the Cheshire sewage treatment plant. This consists of a 1,770 feet earthen dike as well as investigating the feasibility of federal participation in solving the flood

FIGURE 16

USDA, SCS, Exigency and Nonexigency Actions

a. Exigency

Falls River - 7 Sites	Debris removal, channel reconstruction, bank stabilization and seeding.
Writes Pond - 3 Sites	Bridge, Debris and deposition removal and seeding.
Niantic River (Latimer Brook)	Tree removal, bank stabilization and seeding.
Pattaconk Brook - 3 Sites	Bridge, deposition and debris removal, bank stabilization and seeding.
Candlewood Brook	Bridge, deposition and debris removal, bank stabilization and seeding.
Rainbow Brook	Debris and deposition removal, bank stabilization and seeding.
Beaver Brook	Bridge, deposition and debris removal.
Deep River	Bridge, deposition and debris removal.
Eightmile River	Bridge and debris removal.
Indian River	Debris removal, bank stabilization and seeding.
Mill River	Bridge, debris and deposition removal, channel reconstruction, bank stabilization and seeding.
Little River	Debris and deposition removal, and bank stabilization.
Beacon Hill Brook	Debris and deposition removal, bank stabilization, and seeding.

b. Nonexigency

Fairfield County - Halfway River, Monroe and Newtown.

Hartford County - Trout Brook, West Hartford; Branch of Salmon Brook, Glastonbury; Salmon Brook, Granby.

Litchfield County - Pequabuck River, Plymouth.

Middlesex County - Deep River, Deep River; Succor Brook, East Haddam; Moodus River, East Haddam; Falls River, Essex; Hungerford Brook, East Haddam.

New Haven County - Bladens River, Seymour; Wepawaug River, Orange; Fulling Mill Brook, Naugatuck; Farm River, East Haven; Belden Brook, Hamden; Long Meadow Brook, Naugatuck.

New London County - Roaring Brook, Lyme and East Haddam.

Middlesex County - Whalebone Creek, Lyme; Joshua Creek, Lyme; Hunts Brook, Waterford.

Tolland County - Jeremy River, Hebron and Colchester.

problems in the Gilbert Street area of Derby, Beaver Brook, Ansonia; Bladens River, Seymour and Great Hill in Derby.

Following the June flood, priorities for watershed investigations under the Central Coastal River Basin Study were rearranged to address several areas which received significant flood damage. The Indian River in Milford and Orange and the Munenketesuck River in Clinton were added to the study list.

G. State Follow-Up: State Agency Flood Review and Issue Identification

On February 25, 1983, Governor William A. O'Neill directed that the leaders of twenty state agencies or subagencies respond to a questionnaire on flood management. Each agency was requested to delineate its role in flood mitigation, preparedness, response, and recovery. The purpose was to identify areas where improvements were warranted: Figure 17 was compiled from the results of that questionnaire. Measures to mitigate these problems are listed in the section on implementation measures.

Agency	Issue or Comment	Resolution & Comments*

FIGURE 17

DEPARTMENT OF ADMINISTRATIVE SERVICES, BUREAU OF PUBLIC WORKS

Facilities Design and Construction Section	-Facilities, Design and Construction Section staff is inadequate due to vacancies (3 senior design engineers).	3:00
	-New staff could use briefing as to systems.	2:32
Energy Management Section	-There is a need for written procedures which specifically assign activities to key personnel and which provide alternatives to standard (long response) state procedures.	1:13
	-Need portable radios.	2:04
	-Overtime: Develop uniform overtime reimbursement programs for management and others who work overtime during emergencies.	2:40
Tenant Services Section	-Standardized procedures. There is need for standardized procedures.	1:13
	-Agency shares divided responsibilities with DEP. Roles need clarification.	3:00-better communication between agencies will solve problem.

*Resolution 1 = First priority for corrective action.
2 = Second priority for corrective action.
3 = No action planned.

See next section for specific priorities and corrective actions.

Agency	Issue or Comment	Resolution & Comments*
	-Inadequate funding for items other than staffing.	2:40
	-Communication system adequacy: Communication was a big problem during and after the tornado at Bradley, during and after the snowstorm and during and after the flood.	1:13; 2:04
	-Educational programs: Public should be apprised of existing dangers, the need for evacuation, etc.	2:07; 2:09; 2:10
	-Practice drills needed.	3:00-usefulness of practice drills has been questioned by several state agencies.
	-Safety of state-owned dams is poor.	1:02, 1:07, 1:11
	-Channels and culverts: Should be updated to 100-year standard.	1:10, 2:66
DEPARTMENT OF AGING		
Aging	-At DAC's, the role of Aging staff was not well integrated. There should be a representative from each municipality being served at the DAC's working in the DAC.	2:55
	-Not familiar with EO 18.	1:01, 2:32
	-The State Insurance and Labor Departments were not represented at the DAC's. This was inconvenient for the disaster victims who needed assistance from those Departments.	3:00, 2:13 - Insurance problems should be addressed by staff from the National Flood Insurance Program.

Agency	Issue or Comment	Resolution & Comments*
	-The services of the Dept. on Aging can play a bigger role in aiding the elderly immediately following a disaster.	2:13
DEPARTMENT OF AGRICULTURE		
Agriculture	-Statutory Authority is needed to mandate cost-sharing state assistance to an individual farmland owner.	2:02
	-Currently, the SCS provides technical assistance for a disaster project and ASCS cost shares with the farmer in implementation. The federal government has reduced its percentage of cost sharing the expenses of a project, and the farmer must bear a more difficult burden. At the present, the state provides cost-sharing assistance only to municipalities.	2:02
	-Education: The Department of Agriculture should assist in educational programs with regard to insurance coverage in the event of a disaster.	2:08
	-Not all crops in Connecticut can be currently covered by federal crop insurance. The Department of Agriculture, working with the Connecticut Congressional Delegation in Washington, could assist in securing commodity coverage now needed but not available. One such example is coverage for nursery stocks. Research data is needed in various areas of natural disaster for nursery stocks before coverage will be provided.	2:19
DEPARTMENT OF CONSUMER PROTECTION		
Consumer Protection	-Update may be needed on procedures.	1:13

Agency	Issue or Comment	Resolution & Comments*
	-Radios are available only during radiological incidents. Only one car with radio. Currently rely on telephone.	2:04
	-Inadequate funding for items other than staffing. Funding for protective clothing and hip boots is needed.	2:40
DEPARTMENT OF ECONOMIC DEVELOPMENT		
Economic Development	-Funding would be inadequate unless a federal disaster declaration is made. If no federal disaster declaration is made, some state action is needed to meet costs.	2:40
	-There is no central clearing house or central informational file (for info on grants, housing assistance, erosion control, IRS advice, etc.). Need a central clearinghouse or central information file (preferably automated.	2:13
	-Public education: There is a need for increased educational programs for the general public to learn more about how to help themselves and avail themselves of services.	2:10
	-DED surveys were varied from place to place, probably not realistic.	3:00
DEPARTMENT OF ENVIRONMENTAL PROTECTION		
Coastal Area Management	-Development in flood hazard areas. Stronger, more definitive proclamation of state policy regarding development in flood hazard areas would be desirable.	1:01
	-Building Code does not address emergency ingress/egress in flood hazard areas.	2:31

Agency	Issue or Comment	Resolution & Comments*
	-FEMA is not taking an aggressive role in monitoring/enforcing requirements of the NFIP at the local level. The only enforcement mechanism is suspension of a municipality from the FIP. A less drastic measure may promote more enforcement actions. Increase state role in monitoring and enforcement of local responsibilities in pressuring FEMA to enforce its requirements.	2:65
	-Public education: Public needs to be more aware of hazards of developing in flood and erosion-prone areas.	2:07
	-FEMA will only fund the in-kind replacement of roads and bridges; unless a more stringent design requirement is imposed by another agency. In disaster assistance, FEMA ignores the 100-year design standard it promotes in other programs. This is not consistent and is counter to the objective of reducing future flood losses.	1:01, 1:10, 2:66
	-Regulation of buildings in coastal high hazard areas (V-zones) may not be adequate to protect against severe erosion hazards and wave action.	2:01
	-Funding is lacking for the acquisition of vulnerable properties to prevent recurrent losses and solve chronic problems at locations that are already developed.	1:05, 1:06, 2:61, 2:62
	-Coordination: Need better internal coordination of damage estimates.	2:38
	-The state lacks a program for the acquisition of most vulnerable coastal flood and	

Agency	Issue or Comment	Resolution & Comments*
	erosion-prone properties. Need higher level of funding for Section 1362 of the Federal Flood Insurance Act (or alternate state funding source) to allow acquisition of damage-prone properties in advance of a major flood rather than in the aftermath.	1:06, 1:05, 2:61, 2:62
	-Need more stringent state standards for and regulation of development in coastal high hazard areas (V-zones) as a major component of a comprehensive flood management program for the state.	2:01
Conservation and Preservation	-PL566, Corps and state-owned dams: Operation and monitoring, inspection, maintenance. Some dams have written procedures; others are lacking or are in the process of being written.	1:02, 1:07, 1:11, 2:14, 2:20
	-Staffing for operation and maintenance of dams: Lack of sufficient personnel at the field level has resulted in lower maintenance. This has been reflected in increased damage to roads, culverts, and bridges. Staffing needs to be increased to fulfill the agencies' duties in this area. Two crews of six people each are needed in each district solely for the purpose of operating and maintaining dams or an increase in the district maintenance crew.	1:02, 1:11, 2:52
Conservation and Preservation (Field)	-Communications: Communications system should be upgraded and improved to provide coverage in extreme corners of the state. Replacement/update of mobile units is needed for dependability.	2:04, 2:42
	-Preparedness plans (for dam safety). Areas with existing	

Agency	Issue or Comment	Resolution & Comments*
	plans need to be upgraded (update schedule); and in areas that don't have plans, they need to be formulated.	1:02, 1:11, 2:14, 2:20
	-There is no official contact person or procedures within the agency for public notification/municipal outreach; with the exception of some dam procedures that are site specific.	2:52
	-Dam safety is based on maintenance and repair, both of which are costly. Increased staffing/funding is needed in these areas.	1:02, 1:11
	-Option to do immediate repairs and preventative maintenance is needed so dams are not washed out.	1:02
	-FEMA has been very slow in responding to $ claims for damage repairs, which delays project completion and public usage. After damage, federal monies should be made available sooner to help areas return to normal.	1:04
	-Warning System: Should be developed, especially for high hazard areas.	1:07, 1:17
	-Coordination and communication must be improved between agencies and local level by establishment of procedures/planning. Other units and agencies must be informed along with the DEP as to capabilities and functions of these agencies. This will prevent lost time in coordination of services and/or information.	1:13
Central Office	-Communication: Improve two-way radio network to provide full statewide coverage. Both the Central Office radio, which is	

Agency	Issue or Comment	Resolution & Comments*
	operating at partial power, as well as some of the field and mobile units need replacing.	2:04, 2:42
	-There are no written policies regarding aid to municipalities. This adds to confusion during an emergency.	1:14, 1:15, 1:03, 1:08
	-Post-flood insurance money from the federal government is slow in coming. This results in delays in completion of damage repairs and opening of facilities to the public. Improved coordination between DEP, FEMA and OPM is needed to assure timely repairs of damage to state property.	1:04
	-Department's role: A more clearly defined role is needed to improve response.	1:13
	-There is little notification or municipal outreach. Communication with municipalities can be improved.	1:13, 2:13
	-Dam safety of state-owned and operated dams can be improved by the establishment of two specialized crews to maintain and operate state-owned dams. One crew of six to function east of the Connecticut River and one crew of six to operate west of the Connecticut River.	1:02, 1:11, 2:52
	-Acquistion of flood-prone lands: These lands are acquired by the Environmental Quality Division and are turned over to the C & P Div. to be maintained with no increase in staff to maintain and patrol.	2:52
	-Departmental Emergency Operations Center: EOC's could be established at district headquarters for coordination of the Department's work.	2:17

Agency	Issue or Comment	Resolution & Comments*
	-The Conservation Officers should be made available for both search and rescue operations during the flood and could be used to augment the state and local police in securing areas after flooding. The CO's could be assigned to a duty station and be dispatched from that station to locations where help has been requested.	1:13
Natural Resources Center	-The Damage Reporting Schemes need improvement. The quality of information varied between agencies, towns, and private individuals. The state should provide guidelines for damage estimates.	2:39
	-Appoint a single state staff person to be the damage report officer. This individual should also be responsible for revising the data, as well as collecting overall disaster expenditures.	2:38
	-The state absorbed all 25 percent of non-federal cost sharing. Connecticut is the only state to have done this and it sets a bad precedent for a larger disaster. The action also serves to discourage strong municipal flood programs by promising that the state and federal government will always bail out the towns.	1:12
	-Many state, federal and local agencies, plus private property owners, have experienced a need for future flood warnings (i.e., more lead time between warnings and floods). Support legislation to initiate an automated flood warning system.	1:17, 1:07
Water Compliance Unit	-The Water Compliance Unit and the contractors designing facilities need accurate, up-to-date information in order to carry out a successful program.	1:01, 1:32
	-Sometimes flood improvement measures (i.e., channelization)	

Agency	Issue or Comment	Resolution & Comments*
	conflict with environmental management--destroys habitat, etc. There is a need to coordinate flood improvement measures with environmental concerns.	3:00-Recent changes in DEP procedures, policies and regulations should mitigate this problem.
	-Many treatment facilities have been designed at less than 100-year protection from flood flows.	2:23, 2:24
	-Preparedness planning for treatment facilities needs to be improved; in turn, this requires improvements in flood warning system.	2:22
	-Excess inflow into facilities can flood a plant from within. Remove roof leaders from sewer system.	2:25
Water Resources Unit	-Insufficient assistance to municipalities. Additional technical and general assistance should be provided to municipalities in flood management and flood hazard mitigation measures.	2:14, 2:15
	-Flood-prone areas: WRU should have the authority to post flood-prone areas.	1:01
	-Increased funding is needed for extension of the encroachment line program and for flood and erosion control projects.	2:47
	-WRU solely dependent on phones for communication and on State Office Building power. Failure of either would have serious impact on DEP emergency operations.	2:04
	-Education: Increased technical training needed for staff.	2:52

Agency	Issue or Comment	Resolution & Comments*
	-Public awareness campaigns needed.	2:07, 2:09, 2:10
	-Practice drills: Practice drills needed annually.	3:00-Usefulness of practice drills is questioned by several of the state agencies.
	-Most state agencies are not submitting actions for review of consistency with E.O. 18.	1:01, 2:32
	-Bridges and culverts--issue of design standards. Local standards mandating 100-year design standard for roads and bridges is needed.	1:10
	-Floodplain zoning: Additional technical assistance needed to local officials to ensure proper understanding and implementation of flood management standards for floodplain zoning.	2:21, 2:43
	-Early warning system needed.	1:17, 1:07
	-Funding: Additional funds should be appropriated for the acquisition of flood hazard areas.	2:61, 2:62
	-Dam Safety Program: A sound commitment from the legislature is necessary to enable DEP to establish and implement a comprehensive Dam Safety Program.	1:02, 1:11
	-Dam Safety Program is understaffed. Six positions are needed for the Dam Safety Program (and required funds to support same).	1:02, 1:11
	-No budget for repair of state-owned dams; no program of repair of privately-owned dams. Establish low interest loan program to assist private owners with the repair of their dams.	1:02, 1:11

Agency	Issue or Comment	Resolution & Comments*
	-Include within Section 25-85 the ability of a municipality through its flood and erosion control board to enter into agreement with the state to receive assistance with maintaining and/or ensuring the safety of a dam when such structure provides substantial public benefit.	1:02
	-Penalties for failure to comply w/orders have never been implemented.	1:02, 2:65
	-No program of regularly scheduled dam inspections.	1:02, 1:11
	-There is no current requirement for registration of existing dams. Revise Section 22a-409 to include the requirement for all dams within Connecticut to be registered with the Commissioner of DEP. Establish a fee for such registration in order to assist in offsetting program costs and require the Commissioner of DEP to establish a schedule and periodically inspect all dams. Establish a fee schedule for dam inspection program.	1:01, 1:10
	-No criteria for determination of spillway adequacy and determination of structural integrity.	1:02, 1:11
	-The supervisory power of the DAS over dam repair in excess of $100,000 can be redundant and cause delay.	2:59
	-Dam inventory information needs updating.	2:58
	-A nonlapsing dam maintenance fund has not been established by the state.	1:02, 1:11
	-There are no provisions for generating revenue from the operation of existing dams.	2:59

Agency	Issue or Comment	Resolution & Comments*
	-Provisions in the state statutes for establishment of taxing districts to finance maintenance and repair of dams are inadequate.	3:00-See recommendations concerning improvements to dam safety program.
	-The threat of legal action by the Attorney General's Office against dam owners who fail to comply with requests for repairs generally persuades owners to comply.	3:00
	-The Water Resources Unit has not established an adequate enforcement process. Amend Sec. 22a-6 to allow Commissioner of DEP to undertake the necessary repairs to ensure the safety of state-owned dams which do not exceed expenditures of $1,000,000 (see proposed dam safety legislation).	1:59
DEPARTMENT OF HEALTH SERVICES		
Emergency Services Section	-Not familiar with EO #18.	1:01, 2:32
	-Water supply emergency plan should be updated.	2:12
	-Getting water trucks to replace water supplies was a problem.	2:12
Water Supplies Section	-Problem in intra-agency coordination when a problem overlaps two areas of responsibility within the Department. Example: Nursing homes. The Water Supply Section has jurisdiction over water supplies for nursing homes, and there is a nursing homes' section with jurisdiction over other aspects of nursing home operations.	1:13
	-Coordination problems between towns and state agencies. Delineate responsibilities for	

Agency	Issue or Comment	Resolution & Comments*
	actions of state and local health departments in responding to emergencies (DOHS - lead agency in response).	1:13
	-Practice drills are needed at some established frequency.	3:00-Usefulness of practice drills is questioned by several of the state agencies.
	-Problems may be encountered in dissemination of water from tank trucks during a cold period (freezing, leaking, etc.). Vandalism is also a possibility.	1:13, 2:12
DEPARTMENT OF HOUSING		
Housing	-The largest problem was in the area of overtime pay. Overtime for managerial staff was not authorized during flooding or tornado response.	2:40
DEPARTMENT OF INCOME MAINTENANCE		
Income Maintenance	-Staffing levels are inadequate. Both DIM and Dept. of Human Resources hired temporary full time staff and/or completed majority of program work through authorized overtime.	2:40
	-Public notification/education. Press releases for the individual and family grant program must stress that this is a program of last resort for grants to meet essential needs up to a maximum of $5,000 per family.	2:10
	-Despite both entrance and exit interviews with FEMA staff, many flood applicants left the DAC's without filing for all appropriate disaster assistance programs. As a result, Connecticut found it necessary to extend the IFG application period about seven weeks past the open enrollment	

Agency	Issue or Comment	Resolution & Comments*
	period. The majority of the late applicants were individuals who had filed an SBA application at the DAC but had not simultaneously filed an IFG application.	1:04, 2:10
	-Despite the fact that press releases issued by both federal and state agencies were coordinated by the FEMA Public Education Office, the public had, and continues to have many misconceptions about disaster assistance programs (a widespread myth was that anyone applying for the IFG Program would immediately receive $5,000).	2:10
	-A "revolving door" system occurred when SBA reconsidered the original SBA loan determination (upon submission by applicants of additional financial information). Example: If SBA loan was originally approved, IFG grant denied, when SBA reconsidered and denied the loan, IFG case reopened. Many cases processed more than once. If this process continues, there is a need for SBA to cut off the reevaluation process at least four weeks prior to the close of the official IFG grant processing activity (set by regulation). Such a time period is needed in order for IFG to reevaluate eligibility and complete all required grant award activity, fair hearings, etc.	2:28
	-Federal monies were slow in coming, and presented cash flow problems for DIM.	1:04
	-Single disaster application. FEMA is currently studying the feasibility of one disaster application. The single application concept should be pursued.	2:35

Agency	Issue or Comment	Resolution & Comments*
	-In addition, the feasibility of <u>one verifier</u> to complete one on-site verification for all disaster programs should be studied. Both the single application and single on-site verification should prove much more efficient and cost effective.	3:00-FEMA has considered and field tested "single verification" and has determined that it is not feasible.
DEPARTMENT OF INSURANCE		
Insurance	-No problems, very limited role.	3:00
DEPARTMENT OF MENTAL HEALTH		
Mental Health	-Need to expand current agency role in training and consultation for a) on-going training about the impact of disasters on the mental health of victims and b) techniques of psychological first-aid for "front-line" disaster staff who arrive early on the scene. Example: Soil Conservation staff who may encounter victims in various states of emotional distress.	1:13
	-Current DMH staffing levels are not adequate to carry out post-flood outreach mental health services. Outreach has to be quite extensive because victims are not considered (and do not consider themselves) psychiatric clients and rarely come to identified psychiatric services on their own. DMH therefore has to work with a variety of community agencies (Red Cross, Visiting Nurse Association, churches,	

Agency	Issue or Comment	Resolution & Comments*
	schools, etc.) to provide non-stigmatized services.	3:00
	-Funding for items other than staffing. Development of a disaster relief fund would allow DMH to contract out for emergency and crises stabilization services. This may also help alleviate staffing problems.	2:40
	-Coordination with other agencies: Considerable time was spent on the phone during post-flood response in trying to determine which agency could provide what service to victims. Responsibilities should be clearly delineated and specified in plan.	1:13
	-Training: There is a need for "paper drills" at least annually within and between agencies. Training should be provided annually for all agencies, to assure familiarity with and up to dateness of procedures.	2:11, 3:00 -Usefulness of practice drills has been questioned by several state agencies.
	-Communication System Adequacy: A list of key state personnel is needed to speed the process of disseminating and receiving information and to implement plans in a timely manner and in a coordinated fashion.	1:13, 2:16
	-Education needed for staff of other agencies in psychological first aid techniques for 'front line' disaster staff.	2:11

Agency	Issue or Comment	Resolution & Comments*
	-For the public, education is needed about stress reactions to the disaster, long and short term; where they can obtain various types of help (info to be provided in a timely fashion) from various state agencies. Educational programming should go through various community channels: senior citizens centers, churches, schools, and public officials.	2:07
	-For the public, education is needed on safety related matters to prevent deaths due to swimming and rafting in flood waters.	2:09
	-Data accessibility: a) state data is compiled manually and is not systematic or coordinated in methodology and distribution. This led to great difficulty in developing a grant application for federal assistance and b) federal list of victims were not shared with agencies or crisis staff--this caused difficulty in development of out-reach efforts (basic planning data was needed--density of impact/locales hardest hit, etc.).	3:00-This is an important issue, however automation of state data bases is a much larger issue than can be addressed in this report. 1:13, 2:13,
	-Not familiar with EO 18.	1:01, 2:32
	-State preparedness plans should be updated. Planning for mental health needs/ services should be included.	1:13, 2:13
OFFICE OF POLICY AND MANAGEMENT		
Office of Policy and Management	-Emergency Operations Plan is out-dated. Certain responsibilities have been transferred to DEP, this is not reflected in plan. The EOP should spell out in more detail what OPM should do.	1:13, 2:13
	-Drainage openings (such as bridges); if replacement is	

Agency	Issue or Comment	Resolution & Comments*
	needed, to what design standard is structure rebuilt? State structures are in line with EO 18 guidelines, but what is state standard in relation to municipal reconstruction? Some towns don't adopt the state standard spelled out in DOT manuals. This may need to be addressed statutorily.	1:10
	-Staffing is inadequte for OPM's public assistance programs. Currently using staff from other tasks to work 70 percent on floods. One staff person 100 percent on floods. Normal work tasks have been suspended.	2:40
	-Towns were often confused as to damage estimates. Federal Damage Survey Reporting Forms were misunderstood.	2:36
	-Non-profit groups, such as the Boy Scouts, who own dams are not eligible for FEMA funds to repair damages structures or for replacement.	3:00-Issue requires more study before a recommendation can be made.
	-SCS programs for repair of channels and culverts and bank stabilization: Visual impact should be reduced.	2:54
	-Floodplain zoning: Floodplain zoning and acquisition of flood hazard areas by towns or state should be continually stressed as tools to be utilized in protecting life and property.	1:01, 1:05, 1:06
	-OPM questions adequacy and up to dateness of water supply emergency planning.	2:12
	-Many people "can't afford" flood insurance. If property loss results, these people have lost everything. There is a need for a FEMA educational	

Agency	Issue or Comment	Resolution & Comments*
	program to inform people about the importance of flood insurance.	1:14
	-Training: Consideration should be given to training of temporary emergency personnel who would be hired to work during emergencies (cost is a problem) OR training for state personnel in emergency operations. (OCP doesn't have enough staff.)	2:11
	-Damage reporting: Accurate information for damage estimates is a major problem (for initial estimate of state damage for the Governor). Data is hard to get; figures vary--either inflated or deflated. Training may solve this problem since regulations must be known to do estimates.	2:39
	-DAC's and EOC's: Emergency operations centers and disaster assistance centers should be located in areas with public transportation if possible OR transportation should be provided for the duration.	1:13, 2:13
	-A separate person and staff should be in charge of: 1) coordination of state agencies to staff DAC's and 2) coordination of public assistance.	2:29
	-FEMA should coordinate with the public assistance coordinator (OPM) in establishing priorities for FEMA work areas.	2:37
DEPARTMENT OF PUBLIC SAFETY		
Division of State Police	-Inadequate staffing levels for Emergency Services Unit of the State Police.	2:40, 2:49
	-Funding levels for items other than staffing are inadequate. Need additional funds for Field Command Post and Communication Equipment.	2:48
	-Problem with coordination: Local Chief Executives do not	

Agency	Issue or Comment	Resolution & Comments*
	want to leave their towns to attend coordination meetings.	1:13
	-If phones were out communication system would not be adequate.	2:04
	-Practice drills: Tabletop or Command Post Exercises for state and local officials are needed once every two years.	3:00-Usefulness of practice drills has been questioned by several state agencies.
	-Data accessibility for dam information: Need access to dam information and qualified personnel to interpret conditions. (Maps of all towns are needed.)	2:58, 2:30
	-Preparedness planning: Need delineated chain of command or flow chart delineating responsibility and places to get help, equipment, etc.	2:16, 1:13
	-Roads and bridges: Improve the availability of good town maps.	1:13
	-There is a need for quality food for emergency workers.	3:00
	-Problem informing State EOC on local conditions.	1:13, 2:04
	-Problem in identifying and confirming road conditions. Helicopter or small plane to observe from air would alleviate this problem as well as provide traffic information. If loudspeaker was installed, would also facilitate alerting residents of evacuation orders. Would aid in special rescue missions.	2:48
	-Mobile State Police Command Posts are needed.	2:48

Agency	Issue or Comment	Resolution & Comments*
	-Communications: More repeater radios for field personnel would allow better communications for the towns to Connecticut State Police (call on microwave radio system).	2:04
Military Department	-Unknown whether agency-owned or managed buildings are located in flood zones.	2:27
	-Coordination problems in establishing priorities for debris removal. Receive many requests for equipment from towns, no method to establish priorities for these requests. This is also true in rescue efforts and evacuation. The Military Department should be the last agency contacted to provide whatever support is requested.	1:13
OFFICE OF CIVIL PREPAREDNESS		
Office of Civil Preparedness	-Agency role should be expanded, but staffing is a problem. More intensified planning guidance to town could be provided.	2:50
	-Staffing level is barely adequate. Currently 80% of staff time is spent on nuclear accident or attack. A larger planning staff would allow the agency to pay greater attention to all of the various areas of emergency planning (natural disaster, nuclear attack, nuclear reactor accident, etc.). It would also improve agency capability in responding to disasters.	2:50
	-Funding levels are inadequate. Sand bag stockpiles are inadequate, inadequate funding to allow for maintenance and repair of civil preparedness communications equipment and replacement of obsolete	

Agency	Issue or Comment	Resolution & Comments*
	equipment. Increased funding is needed for OCP to increase sand bag stockpiles, allow for maintenance and repair of civil preparedness communication equipment and replacement of obsolete equipment.	2:44, 2:45, 2:48
	-Emergency equipment: An inventory of equipment is needed which should be checked and monitored periodically, especially equipment which is loaned to towns.	2:16
	-Large percentage of the public is unaware of the availibilty of flood insurance or fails to understand its importance.	1:14
	-OCP is not familiar with EO 18.	1:01, 2:32
	-Emergency Operation Center, space problem: The state EOC needs additional space for official press conference and media briefings during times of emergency (presently an effort is being made to correct this problem).	2:46
	-More specific contingency planning at the local level is needed.	1:15, 2:43
	-Serious problems in getting dam owners to comply with repair orders.	2:65
	-Temporary housing/emergency shelters. State Department of Housing may need legislation which would allow them to circumvent normal purchasing, contracting and hiring procedures in an emergency to facilitate development of emergency mobile home parks and other aspects of the temporary housing program.	1:03

Agency	Issue or Comment	Resolution & Comments*
	-Training: Training is needed for state agencies in social service fields for the disaster relief programs they implement.	2:11
	-The state must insure that local officials understand the importance of timely damage reporting. (11-24-82 Advisory Bulletin was sent to local officials by OCP to stress this point and to provide guidance in assessing damages.)	2:38, 2:39
DEPARTMENT OF TRANSPORTATION		
DOT	-DEP and DOT have uniform policies re: reconstruction of facilities to 100-year design standards. The problem is with the towns who don't know what policies to adopt.	1:01, 2:52
	-Knowing how much money to allocate in budget to cover emergencies is a problem. There is no mechanism for recovering costs incurred in connection with FEMA (other than actual damages). For example, DOT had to bear administrative costs, overtime, etc.	2:40
	-The Department owns buildings in a flood zone, no preflood damage estimates have been made, and no mitigation measures in place.	2:27

VI. HAZARD MITIGATION IMPLEMENTATION MEASURES

In this section, the action items have been categorized as either first priority or second priority. Actions are placed in the first priority category since they will either: (1) correct significant program deficiencies, thus strengthening overall flood management or (2) prevent significant flood damage.

Due to the large number of second priority actions, Governor William A. O'Neill has charged the Department of Environmental Protection with the development of a detailed work plan to ensure implementation. The second priority issues, shown in Appendix A, identify what the state should be working toward in its flood management programs.

Within each category described above, the action items are divided into short- or long-term actions. A short-term action is anything which can be accomplished in less than 12 months. Long-term actions require more than 12 months to complete or are on-going in nature. Generalized costs and benefits have been added.

As noted in the previous section, the issues and problems identified by state agencies (through the state agency questionnaire) and other issues which have been identified by the planning staff have been addressed through the implementation measures included here. The issues have been cross-referenced with the appropriate section of the implementation measures. A "1" next to an issue indicates a first priority action, and the corresponding implementation measure can be found in the first priority section that follows. All first priority actions are shown in Figure 18. A "2" indicates a second priority action, and the corresponding implementation measures can be found in Appendix A. The implementation measures are numbered consecutively within each section.

FIGURE 18

FLOOD HAZARD IMPLEMENTATION MEASURES
FIRST PRIORITY ACTIONS

Action	When	Who	Funding	Lead Agency	x-Costs *-Benefits	Comments
SHORT-TERM ACTIONS						
01-Prepare a State Statute on Flood Management to include the policies of E.O. 18; DEP's flood management policies; posting of flood zones; standards for state-sponsored road, bridge, culvert and building designs.	1984 Legis. Session	DEP	Subject to Staff Availability	DEP	x-Minimal staff costs. *-Long-term reduction in damage.	-A preliminary draft is now available.
02-Improve dam safety program (staff and personnel changes; repairs to state-owned dams). See also long-term actions.	1983 Legis. Session	Legislature	Legislature	DEP-WRU	x-Staff: $100,000+ dams: $1,000,000. *-Prevent loss of life and property.	-Passed and signed by the Governor, July 1983.
03-Conduct a workshop for commercial and industrial property owners on flood preparedness.	June 1983	CE/DEP/DED	CE Registration Fees	CE/DEP	x-No state costs, Corps funded. *-Reduction in commercial and industrial property damage.	-Letter of support sent by Governor to participants. Workshop held June 1983.
04-Streamline FEMA procedures for distribution of disaster funds in order to expedite disaster payments.	ASAP	FEMA	NA	FEMA	x-No state costs. *-Faster and better disaster assistance.	-FEMA National Office is in the process of modifying payment procedures.
05-Consider purchasing floodplains as a priority for purchase of recreational land under Sec. 7-131d of the CGS.	ASAP	DEP-LA/MUN	USDI, NPS, State	DEP/MUN	x-No additional state costs. *-Prevent increased damages from development.	-Policy change only.
06-Consider purchase of floodplain farmland in purchase of farmland development rights under Sec. 22-36aa of the CGS.	ASAP	DAG	Legislature	DAG	x-No additional state costs. *-Prevent increased damages from development.	-Policy change only.

FLOOD HAZARD IMPLEMENTATION MEASURES
FIRST PRIORITY ACTIONS

Action	When	Who	Funding	Lead Agency	x-Costs *-Benefits	Comments
07-Investigate development of an automated flood warning system for all state-owned dams posing a significant threat to public safety.	ASAP	DEP/RFC/NWS	Unidentified	DEP	x-Staff costs. *-Increased safety factor at dams.	-Study group established July 1983.
08-Follow-up local actions delineated in the Hazard Mitigation Team Reports (15 and 90 day) and expedite feasibility studies for about two dozen towns with significant flood problems.	1983-84	MUN/CE/DEP/SCS	FED/State/Local	MUN/DEP	x-Possible project costs. x-Full-time staff costs. *-Reduced construction costs and reduced damages.	-See Sections IV, "Inventory of Existing Mitigation Measures" and V, "Post Flood (st)" of this report.
09-Inventory progress on these actions one year from the date of this report and report to the Governor's Office.	8/84	OPM/DEP/OCP	NA	DEP	x-Staff costs. *-Ensure compliance with recommendations.	
LONG-TERM ACTIONS						
10-Draft legislation to require a standard for municipal road, culvert and bridge construction and reconstruction.	1985 Legis. Session	MUN/DOT/DEP	DOT/DEP/FEMA	DEP/DOT	x-Higher initial construction costs. x-Staff costs. *-Eliminate repeated road and bridge damage at local level. *-Long-term reduction in damages. *-Higher federal reimbursement.	
11-Improve Dam Safety Program (repairs to state and privately owned dams; staffing of Dam Safety Program; improvement of monitoring and enforcement procedures). See also short term.	Ongoing	DEP-WRU	Legislature	DEP-WRU	x-Staff costs: $150,000/yr. x-Dam repair costs: $1,000,000/yr.	

FLOOD HAZARD IMPLEMENTATION MEASURES
FIRST PRIORITY ACTIONS

Action	When	Who	Funding	Lead Agency	x-Costs *-Benefits	Comments
12-Draft legislation for a state/local cost-sharing formula for disaster assistance to municipalities.	1984-85	DEP/OPM	Subject to Staff Availability	DEP	x-Staff costs. x-Will cut state costs for disaster assistance by at least 50%. *-Will provide incentive to towns for flood management programs.	
13-Revise Emergency Operations Plans for all state agencies involved in responding to floods.	1983-84	Agencies/ OCP	Subject to Staff Availability	Each Agency	x-Staff costs. *-More cost efficient and effective emergency response.	-Especially Aging, DEP, DMH, BPW, State Police, OPM, and Labor.
14-Work with local officials to help towns educate their citizens on the importance of flood insurance.	1983-84	DEP/MUN	Subject to Staff Availability	DEP	x-Staff costs. x-Will reduce losses to individuals.	
15-Conduct a workshop or workshops on updating municipal emergency operations plans to include a flood element.	1983-84	OCP/DEP/ Towns	Unidentified	OCP	x-Staff costs. *-Improved municipal response to flooding. *-Reduced damage and loss of life.	
16-Develop flood management system on drainage basin basis. (Basins rated by potential for damage.)	1983- ongoing	DEP	FEMA-75%/ State-25%	DEP	x-Full-time staff costs (one position). *-Set priorities for state flood-control expenditures. *-Provide guidelines for municipal basin management.	
17-Implement a pilot program for a statewide automated flood warning system.	1983 Legis. Session	DEP/NWS	Legislature	DEP	x-$200,000. *-Increased flood warning time. *-Significant reduction in losses.	
18-Incorporate long-term issues from 406 Report into Long-Range Water Resources Planning Program (mandated under Sec. 22a-352 of the CGS).	Ongoing	DEP/IWRPB	Exsiting Staff	DEP	x-No additional costs. *-Ensure long-term compliance with recommendations.	

APPENDIX A

HAZARD MITIGATION IMPLEMENTATION MEASURES

SECOND PRIORITY ACTIONS

FLOOD HAZARD IMPLEMENTATION MEASURES
SECOND PRIORITY ACTIONS

Action	When	Who	Funding	Lead Agency	Short or Long Term	x-Costs *-Benefits	Comments
LEGISLATIVE AND REGULATION ACTIONS							
01-Draft legislation for protection of barrier beaches and coastal high hazard (V) zones.	1985 Session	DEP-CAM	Subject to Staff Availability	DEP-CAM	Long	x-Staff costs. x-Possible implementation costs. *-Reduced coastal flood damage. *-Reduced disaster assistance. *-Increased coastal recreational opportunities.	
02-Draft legislation to allow state/local cost-sharing assistance to farmers in the event of a disaster. Submit to legislature.	1985 Session	Agriculture	Subject to Staff Availability	Agriculture	Long	x-Staff costs. *-Increased assistance to farmers. *-Will help retain active farmland.	
03-Draft legislation to allow the Dept. of Housing to circumvent normal purchasing, contracting and hiring procedures in an emergency to facilitate the development of emergency MHP's and other aspects of the temporary housing program.	1985 Session	Dept. of Housing	Subject to Staff Availability	Dept. of Housing	Long	x-Staff costs. *-Expedite disaster assistance process.	
04-Investigate the need for portable radios for intra- and inter-agency communications for DEP, DAS, State Police, Consumer Protection, and report to the legislature and the Governor.	1985 Session	DEP/DAS/ SP/CP	Subject to Staff Availability	DEP/DAS/ SP/CP	Long	x-Staff costs. x-Possible implementation costs. *-Improved disaster response through better communication.	

FLOOD HAZARD IMPLEMENTATION MEASURES
SECOND PRIORITY ACTIONS

Action	When	Who	Funding	Lead Agency	Short or Long Term	x-Costs *-Benefits	Comments
05-Amend existing flood control legislation to require public hearings in order to determine the acceptance of proposed SCS P.L. 566 projects.	1985 Session	DEP/SCS	Subject to Staff Availability	DEP/SCS	Long	x-Hearing costs. x-Staff costs. *-Early discussion and settlement of issues would expedite projects and save money.	
EDUCATION							
06-Conduct Dam Safety Conference for owners of private dams.	9/83	DEP/FEMA	FEMA/Registration Fees	DEP-WRU	Short	x-Minimal staff costs. *-Education of private dam owners to improve safety of privately-owned dams.	
07-Develop a professional public service announcement to explain flood hazards.	1983-84	DEP/TV Stations	Unidentified - possible donation of a public service spot	DEP	Short	x-Production costs. *-Increased public awareness of hazards will increase mitigative actions.	
08-Develop education programs for farmers with regard to insurance coverage in the event of a disaster.	1983-Ongoing	Agriculture	Unidentified	Agriculture	Short	x-Staff costs. *-Reduce losses to farmers.	
09-Prepare a short, public service announcement aimed at reducing deaths from recreational use of flood waters to be broadcast during and after flooding.	1983-84	FEMA/DEP/TV Stations	Unidentified - possible donation of a public service spot	DEP	Short	x-Staff costs. *-Reduced loss of life.	
10-Improve distribution of brochures on all available disaster assistance programs.	1983	FEMA/State	Unidentified	FEMA	Short	x-Staff and publication costs. *-Simplify disaster assistance process for individuals seeking assistance.	-FEMA Document DR&R 18, "Program Guide: Disaster Assistance" is available for distribution.

FLOOD HAZARD IMPLEMENTATION MEASURES
SECOND PRIORITY ACTIONS

Action	When	Who	Funding	Lead Agency	Short or Long Term	x-Costs *-Benefits	Comments
11-Institute ongoing training for disaster programs within each state agency. (Note: FEMA has technical training for IFG and temporary housing programs.)	ASAP-Ongoing	Each State Agency	Subject to Staff Availability	Each State Agency	Long	x-Minimal staff costs. *-Increased emergency response capabilities.	-When compared to the two nuclear exercises required every year, the planning for responding to a major disaster does not get the attention it deserves.
PLANNING AND SPECIAL STUDIES							
12-Revise Statewide Water Supply Emergency Plan.	1985	DOHS/DEP Utilities	Subject to Staff Availability	DOHS	Long	x-Full-time staff costs. *-Improved water supply protection for all emergencies.	-Contingent upon increased FEMA funding for emergency management.
13-Update State EOP in accordance with FEMA's new Integrated Emergency Mgt. System (IEMS) concept.	1983-85	OCP/State Agencies	Subject to Staff Availability	OCP	Short	x-Staff costs. *-Improved disaster response.	-IEMS requires state and local governments to perform a hazard analysis based on guidance published by FEMA. Plan will be developed to address hazards.
14-Complete preparation of operation and maintenance procedures for P.L. 566, Corps and state-owned dams; disseminate information to field staff and maintain central office copy.	ASAP	DEP	Subject to Staff Availability	DEP	Short	x-Staff costs. *-More effective operation and maintenance procedures.	
15-Investigate the possibility of modifying existing or proposed flood control reservoirs for increased water supply storage.	Underway	CE	CE	CE	Short	x-No state costs. *-Potential for increased water supply during droughts.	

FLOOD HAZARD IMPLEMENTATION MEASURES
SECOND PRIORITY ACTIONS

Action	When	Who	Funding	Lead Agency	Short or Long Term	x-Costs *-Benefits	Comments
16-Prepare a flow chart delineating state agency responsibilities and places to get help, equipment, etc.	1983	OCP, Other Agencies	Subject to Staff Availability	OCP	Short	x-Staff costs. *-Increased efficiency of response units.	-The revised state EOP will probably contain such a flow chart.
17-Investigate the feasibility of using DEP district headquarters for departmental emergency operations centers.	1983	DEP	Subject to Staff Availability	DEP	Short	x-Staff costs. *-Increased efficiency of departmental emergency response.	
18-Provide sandbag guidance to towns and state agencies.	1983	OCP	Subject to Staff Availability	OCP	Short	x-Staff costs. *-Increased preparedness.	
19-Sponsor a study to document the need for crop insurance and lobby for its passage.	1984-85	DAG, CT Congressional Delegation	Unidentified	Agriculture	Long	x-Staff costs. *-Reduce losses to farmers.	
20-Require all owners of dams considered "major" to prepare E.O. plans and coordinate with local OCP.	1983-85	DEP-WRU Dam Owners	Subject to Staff Availability	DEP	Long	x-Costs: private. x-State staff costs. *-Reduce damages and loss of life from dam failure.	
21-Prepare municipal profiles of coastal flood susceptibility.	1983	DEP	DEP-50%/ FEMA-50%	DEP	Short	x-Staff costs. *-Help state set priorities for coastal flood projects. *-Better documentation of flood problems should lead to better local preparedness actions.	-Study in progress.
22-Draft flood preparedness plans for all wastewater treatment facilities subject to flooding from inflow or stream flooding.	1983-85	DEP/MUN/OCP	State/EPA/FEMA	DEP	Long	x-Staff costs. *-Reduced environmental impact on receiving streams.	-Request grant from EPA or FEMA.

FLOOD HAZARD IMPLEMENTATION MEASURES
SECOND PRIORITY ACTIONS

Action	When	Who	Funding	Lead Agency	Short or Long Term	x-Costs *-Benefits	Comments
23-Inventory all wastewater treatment facilities to determine flood susceptibility and for those susceptible, determine which can be cost-effectively floodproofed.	1983-84	DEP-WC/MUN	EPA/State	DEP/MUN	Long	x-Staff costs. x-Implementation costs.	-Request grant from EPA or FEMA.
24-Develop schedule for implementation of floodproofing of water treatment facilities subject to inflow flooding by separation of sanitary and storm sewers and/or by installing by-pass equipment.	1984-85 and Long Term	DEP/MUN	EPA/DEP	DEP-WC	Long	x-Staff costs. x-Implementation costs. *-Reduced environmental impact on receiving streams.	
25-Prepare a report on the effect of roof leaders on inundation of sewer plants.	1984-85	DEP-WC/MUN	Subject to Staff Availability	DEP/MUN	Long	x-Full-time staff costs. *-Reduce overload on existing STP's at times of high flows.	-Grant needed.
26-Amend the Statewide Long-Range Water Resources Management Plan to include the policy and program recommendations of this report.	1983-Ongoing	DEP/IWRPB	Subject to Staff Availability	DEP	Short	x-No additional state costs. *-Ensure consistency with long-term recommendations of this report.	
27-Inventory state buildings in flood zones and develop procedures for flood preparedness for flood-prone buildings.	1983	DAS	Subject to Staff Availability	DAS	Short	x-Staff costs. *-Reduce state losses.	
COORDINATION							
28-Consult with representatives of the SBA to iron out difficulties caused by conflicting procedures which resulted in the inconvenient and costly extension of the IFG program.	Immediately	DIM/SBA/FEMA	Subject to Staff Availability	FEMA	Short	x-Staff costs. *-Improved disaster assistance to individuals. *-Reduce staff costs for processing applications.	-DIM notes that FEMA has always been their key liaison on procedural matters.

FLOOD HAZARD IMPLEMENTATION MEASURES
SECOND PRIORITY ACTIONS

Action	When	Who	Funding	Lead Agency	Short or Long Term	x-Costs *-Benefits	Comments
29-Investigate separation of Public Assistance and Disaster Assistance Center staff coordination duties.	Immediately	OPM/OCP/ FEMA	Subject to Staff Availability	OPM	Short	x-Staff costs for investigations. x-Additional staff costs at at time of disaster. x-Improved efficiency of both programs.	
30-Meet with State Police to discuss the availability and use of dam information.	1983	DEP-WRU/ SP	Subject to Staff Availability	DEP	Short	x-Minimal staff costs. x-Map publication costs of $5,000. *-Improved information on dam location will lead to improved dam safety procedures.	-A map of Ct. dams is pending publication in the summer of 1983.
31-Work with the State Building Commission Standards Committee in an effort to incorporate NFIP standards into the Building Code.	Ongoing	DEP/SBC	Subject to Staff Availability	DEP	Long	x-Staff costs. x-Possible additional costs to builders at time of construction. *-Significant reductions in property losses.	
32-Brief other state agencies on flood management engineering criteria for state actions and E.O. 18.	1983	DEP-WRU	Subject to Staff Availability	DEP	Short	x-Staff costs. *-Ensure consistency with state policy.	
33-Investigate the feasibility of co-locating the Water Resources Unit EOC with operations in the State EOC.	1983-84	DEP/OCP	Existing Staff/ State Legislature	DEP/OCP	Long	x-Undetermined. *-Better coordination of emergency operations.	-The State EOC should be able to access computerized dam information from a terminal in the State EOC.
34-Continue coordination meetings between DEP/CE/SCS; at least bi-annually.	Ongoing	DEP/CE/SCS	NA	DEP	Long	x-No additional staff costs. *-More effective management.	

FLOOD HAZARD IMPLEMENTATION MEASURES
SECOND PRIORITY ACTIONS

Action	When	Who	Funding	Lead Agency	Short or Long Term	x-Costs *-Benefits	Comments
35-Pursue the concept of a single disaster application.	ASAP	FEMA	NA	FEMA	Short	x-No state costs. *-Reduced program costs. *-Faster distribution of relief funds.	-Included in current FEMA "Delta" Project which is now being field-tested.
36-Revise Federal Damage Survey Reporting forms so that it is very clear that figures on forms are just estimates (print statement in red on front of forms).	ASAP	FEMA	NA	FEMA	Short	x-No state costs. *-Reduced confusion regarding federal reimbursement.	-Item #11 on DSR forms already indidicates that figures are estimates. However, it would be helpful if FEMA would investigate modification of DSR forms.
37-Consult with OPM (Public Assistance Coordinator) in establishing priorities for FEMA work areas.	1983	FEMA/OPM	NA	FEMA	Short	x-Minimal staff costs. *-Recognition of state priorities in disaster response.	-FEMA comment: state needs to assert itself in determining work areas at time of disaster.
38-Designate a damage report officer for all disaster and post-disaster damage reporting and disaster expenditures.	1983	OCP/OPM	NA	OCP	Short	x-Minimal staff costs. *-Better coordinated and more accurate damage reports.	
39-Develop written guidelines for damage estimation to improve the accuracy of data and thoroughness of data. Implement training program for individuals who must make estimates.	1984	OCP/OPM	Subject to Staff Availability	OCP	Short	x-Staff costs. *-Improved damage estimation.	-OCP and OPM can provide guidance on types of information to collect, where to report it, when it is needed, why it is needed, etc., but cannot train people in the technical aspects of assessing damages.

FLOOD HAZARD IMPLEMENTATION MEASURES
SECOND PRIORITY ACTIONS

Action	When	Who	Funding	Lead Agency	Short or Long Term	x-Costs *-Benefits	Comments
FUNDING							
40-Develop disaster contingency fund which allows state agencies to deficit spend up to $50,000 to cover agency administrative and operational costs incurred in disaster response which are not federally recoverable.	1984-85	OPM/ Governor/ Legislature	Legislature/ Governor	OPM	Long	x-No additional costs. *-Improved disaster response.	
41-Continue and increase funding for State Assistance Program.	Ongoing	State/FEMA	State/FEMA	State/FEMA	Long	x-Full-time staff costs. *-Increased assistance to municipalities.	
42-Prepare a report for the Governor and State Legislature on the need for funds for increased maintenance and repair of civil preparedness communication equipment and replacement of obsolete equipment.	1984	OCP	Subject to Staff Availability	OCP	Short	x-Staff costs. *-Improved equipment network.	
43-Renegotiate increases in EMA or DPI funding to include more funds for planning guidance to towns.	ASAP-Ongoing	OCP/FEMA	FEMA	OCP/FEMA	Long	x-Staff costs. *-Better town preparedness plans.	
44-Initiate a sandbag replenishment program.	1983-84	Other State and Federal Agencies/ OCP/MUN	Legislature	OCP	Short	x-Staff costs. x-Sandbag costs. x-Possible storage costs. *-Improved flood preparedness and flood response.	-Budget request for $30,000 to stockpile sandbags was recently disapproved by OPM. This request should be resubmitted.

FLOOD HAZARD IMPLEMENTATION MEASURES
SECOND PRIORITY ACTIONS

Action	When	Who	Funding	Lead Agency	Short or Long Term	x-Costs *-Benefits	Comments
45-Reinstitute free sandbag program and institute sandbag filler machine program.	ASAP	CE	Unknown	CE	Short	x-No state costs. *-Improved flood preparedness and flood response.	
46-The State Emergency Operations Center badly needs additional space for official press conferences and media briefings during times of emergency.	1983	OCP	OCP/FEMA	OCP	Short	x-Construction costs. *-Improved media briefing and reduced confusion in operations room.	
47-Request an increase in funding for extension of the SCELP and flood and erosion-control projects.	1984-85	DEP/ Legislature	Legislature	DEP	Long	x-Significant increase in staff and project monies. *-Improved floodplain management of major watercourses. *-Reduced flood and erosion problems.	
48-Conduct a survey of equipment needs for the State Police for use in establishing a field command post and for communication equipment and include a request for such equipment in FY '84-85 budget.	1983	State Police	Federal Grant/ State Revenue	State Police	Short	x-Staff costs for survey. x-Possible equipment costs. *-Improved communication and improved disaster response.	
STAFFING							
49-Document the need for additional staff in Emergency Services Unit of the State Police and make recommendations for required increases.	1983	State Police	Unidentified	State Police	Short	x-Possible increase in staff costs. *-Improved response for all disasters.	

FLOOD HAZARD IMPLEMENTATION MEASURES
SECOND PRIORITY ACTIONS

Action	When	Who	Funding	Lead Agency	Short or Long Term	x-Costs *-Benefits	Comments
50-Increase OCP planning staff to allow the agency to pay greater attention to natural hazards and improve agency capability in responding to disasters.	1983-84	OCP/OPM/ FEMA	Partly FEMA	OCP	Short	x-Possible increase in staff. *-Improved response for all disasters.	-Possible federal funds for this purpose.
51-Identify DEP staff training requirements and prepare a plan to meet those needs, including alternative funding sources for staff training.	1983-Ongoing	DEP	Unidentified	OPM	Long	x-Staff costs. x-Training costs. *-Keep state staff up to date on flood preparedness response techniques.	
52-Delineate need for additional staff for operations and maintenance of state-owned flood-control structures.	1983-84	DEP	Subject to Staff Availability	DEP	Short	x-Staff costs. *-Ensure long-term integrity of flood-control structures.	
POLICY AND PROGRAM							
53-Consider both shoreline erosion and flood-control measures when designing either erosion or flood-control projects.	Ongoing	DEP-WRU and CAM	None Required	DEP-WRU and and CAM	Long	x-No additional costs. *-Improved consistency between programs.	
54-Consider measures to reduce the visual impact from SCS emergency work, including repairs for channels, culverts, and bank stabilization programs.	1983	SCS	SCS	SCS	Short	x-No state costs. *-Reduced environmental and esthetic impacts of repair work.	
55-Implement existing FEMA policy to provide orientation for DAC staff.	Immediately	FEMA	FEMA	FEMA	Short	x-No state costs. *-Improved disaster response.	-Modification in progress by "Delta" project.

FLOOD HAZARD IMPLEMENTATION MEASURES
SECOND PRIORITY ACTIONS

Action	When	Who	Funding	Lead Agency	Short or Long Term	x-Costs *-Benefits	Comments
56-Promote flood insurance purchase.	1983-84 and Ongoing	MUN/DEP/ FEMA	Unidentified	FEMA/MUN/DEP	Long	x-Insurance premium costs to policyholders. *-Significant reduction in individual property losses.	
57-Issue state policy statement to require automated flood warning system for all new flood and erosion control projects.	1983	DEP	Subject to Staff Availability	DEP	Short	x-Minimal staff costs to develop. x-Costs for flood warning system will be taken from flood-control project costs. *-Increased effectiveness of flood-control projects.	
58-Update computerized dam information at an established frequency.	1983-Ongoing	DEP	Subject to Staff Availability	DEP	Long	x-No additional costs. *-Improved access to dam information.	
59-Pursue implementation of the recommendations of the post-flood dam safety report.	1984-Ongoing	DEP-WRU	Subject to Staff Availability	DEP	Long	x-Staff costs. *-Improved dam safety program.	
60-Develop policy for evaluating exemptions from the State Building Code in flood hazard areas.	1983-84	DEP-CAM	Subject to Staff Availability	DEP	Short	x-Staff costs. *-Improve flood resistant construction in hazard zones.	
61-Make provision for implementation of the Sec. 1362 study done by CAM in 1981.	1983-84 and Ongoing	DEP-CAM	Subject to Staff Availability	DEP	Long	x-Staff costs. *-Possible state or local property maintenance costs.	
62-Incorporate the policy of the state to acquire flood-prone lands using Sec. 1362 funds into the Long-Range Water Resources Management Planning Program.	Summer/ Fall/'83	DEP	Subject to Staff Availability	DEP	Short	x-No additional state costs. *-Ensure consistency with recommendations of this report.	

FLOOD HAZARD IMPLEMENTATION MEASURES
SECOND PRIORITY ACTIONS

Action	When	Who	Funding	Lead Agency	Short or Long Term	x-Costs *-Benefits	Comments
63-Pursue adoption of Stream Channel Encroachment Line Regulations.	Summer/ Fall/ '83	Regulations Review Committee/ DEP	Existing Staff	DEP	Short	x-No state costs. *-Regulatory decisions will be more consistent with state policies. *-Cost savings to applicants due to improved knowledge of standards required for permit.	
64-Upgrade the Norwalk River, Route 7 flood-control project to priority status.	1983	DOT/DEP	NA	DOT/DEP	Short	x-No additional costs. *-Significant reduction in downstream flooding. *-Retain federal funding for construction of the project.	-State will lose federal backing if project is not initiated soon.
65-Consult and develop better local enforcement of NFIP requirements.	Ongoing	FEMA/State	FEMA/State	FEMA	Long	x-Possible state staff costs. *-Improved local flood-plain management.	-Both State and FEMA should look into better enforcement of municipal flood management regulation.
66-Develop a municipal outreach program to encourage towns to upgrade their stream crossing standards.	1984-85	DEP/OPM	Unidentified	DEP	Short	x-Staff costs. *-Reduction in municipal disaster expenditures.	-See also 1:10 in first priority section.
67-Inventory progress on these action items one year from the date of this report and report to the Governor's Office.	1984	OPM/DEP/ OCP	NA	DEP	Short	x-Staff costs. *-Ensure compliance with recommendations.	

ABBREVIATIONS

ASAP	As soon as possible	FEMA	Federal Emergency Management Agency
CE	U.S. Army Corps of Engineers	FY	Fiscal Year
CGS	Connecticut General Statutes	Gov.	Governor's Office
CO	CT Dept. of Environmental Protection Conservation Officer	IFG	Individual and Family Grant Program
CP	CT Dept. of Consumer Protection	IWRPB	CT Interagency Water Resources Planning Board
DAC	Disaster Assistance Center	Legis.	State Legislature
DAG	CT Dept. of Agriculture	MHP	Mobile Home Park
DAS	CT Dept. of Administrative Services	MUN	Municipality(s)
BPW	Bureau of Public Works (DAS)	NA	Not Applicable
DED	CT Dept. of Economic Development	NFIP	National Flood Insurance Program
DEP	CT Dept. of Environmental Protection	NPS	National Park Service
CAM	Coastal Area Management Unit (DEP)	NWS	National Weather Service
LA	Land Acquisition and Management Unit (DEP)	OCP	CT Office of Civil Preparedness
WC	Water Compliance Unit (DEP)	OPM	Office of Policy and Management
WRU	Water Resources Unit (DEP)	RC & D	Resource Conservation and Development
DFO	Disaster Field Offices	RFC	Northeast River Forecast Center
DIM	CT Dept. of Income Maintenance	SAP	State Assistance Program
DMH	CT Dept. of Mental Health	SBA	U.S. Small Business Administration
DOHS	CT Dept. of Health Services	SBC	State Building Commission
DOT	CT Dept. of Transportation	SCS	Soil Conservation Service

DPI	Disaster Planning	Sec.	Section
EMA	Emergency Management	SP	Connecticut State Police
EOP	Emergency Operations Plan	S & WCS	Soil and Water Conservation Districts
E.O. #18	Governor of CT's Executive Order Number 18	USDA	U.S. Dept. of Agriculture
EPA	U.S. Environmental Protection Agency	USDI	U.S. Dept. of the Interior